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T. A. RICKARD . . . . . EDITOR
FREDERICK HOBART, SAMUEL SANFORD . . . ASSOCIATE EDITORS

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EDITORIAL.

IT IS GRATIFYING to note that an era of 'strikes,' that is, discoveries of new ore-bodies, is giving to Cripple Creek a prominence recently associated with labor 'strikes.' The gradual withdrawal of martial law marks the betterment in social conditions and the resumption of work at all the mines. This renewal of activity has led to the intersection of several bodies of rich ore, such as have lifted Cripple Creek out of the slough of despond into which it had been pushed by long-continued labor troubles. We trust these discoveries will prove to be extensive and that operations will proceed during 1904 without any of the disorders which disfigured the past year.

IT IS ANNOUNCED that the Exploration Company (London) is to undergo reconstruction, in order to carry out a plan which involves the separation of its industrial and mining assets into two groups, each having its own management. The mining assets are valued at £497,374, and will be taken over by a company capitalized at £750,000. Some arrangement of this kind has seemed inevitable for some time past by reason of unfortunate commitments in French traction shares and other industrials which are quite outside the original scope of the company. Regarding the Exploration Company, as we do, as one of the conservative forces in legitimate mining, we welcome a decision which will strengthen its hands. We trust that the success of such investments as the Tomboy and El Oro mines will lead the New Exploration Company—as it is to be called—to further business alike profitable to itself and stimulating to the mining industry.

NEGOTIATIONS FOR an important consolidation of Southern iron interests are now well under way. This consolidation will include the Tennessee Coal, Iron & Railroad Company, the Sloss-Sheffield Coal & Iron Company and the Southern interests of the Republic Iron & Steel Company. The three companies together own fully three-quarters of the productive iron capacity of Alabama, and in addition have rolling mills and other manufacturing plants, besides the steel plant at Ensley. Matters have been progressed so far that a committee of ex-

perts has been appointed to adjust the valuations at which the properties of the different companies should be put into the consolidation.

THE NUMBER OF blast-furnaces reported in operation on February 1 showed a remarkable increase over that on January 1. The total weekly capacity of the active furnaces on February 1 was 287,700 tons of pig iron. This is 92,100 tons more than at the opening of the year, and is the highest capacity reported since October 1, 1903. The increase is chiefly due to the starting up of a number of furnaces by the United States Steel Corporation near the end of January, when it became apparent that the reduction of output in December had been greater than was really warranted by the conditions. This seems to be proved by the fact that unsold stocks showed a small decrease, falling from 689,000 to 681,000 tons during January. In the basis of the February statement, our blast-furnaces are now making pig iron at the rate of about 15,000,000 tons per year. This is less than last year's output, but still promises a very respectable production. The total make of iron in January was about 970,000 tons; in February it will be not far from 1,050,000 tons.

THE INCREASING confidence in the performance and the efficiency of the gas engine is shown by the use of such engines in a large pumping plant in Philadelphia. The object of this plant is to maintain a high pressure in special mains for use in case of fire. With gas engines as the motive power the pressure required can be quickly reached; while it is not necessary to keep boilers fired, and the expense for fuel is thus reduced.

THE KOLAR GOLD-FIELD.

The discussion evoked by a recent paper on this famous Indian gold-mining district presents several features, among which humor is not entirely lacking. In our last issue we published an abstract of Mr. Mervyn Smith's paper as read before the Institution of Mining and Metallurgy, London, because it afforded a good outline of the geology of a gold-field concerning which little is known in America. Those who are well informed will, however, be aware of the successive reports published at intervals during recent years by Messrs. Bruce-Foote, Bosworth Smith, Evans, Smeeth and Hatch; these reports cover the ground so well that the last contribution on the subject adds little to our knowledge, but it has achieved one object—and a good one—in eliciting discussion. The debate following the reading of the paper dealt with geological structure in relation to persistence of ore, in such a manner as to arouse the fears of shareholders, the result being that the financial papers in London have contained anxious—almost tearful—requests for enlightenment and explanation. The perplexed investors have asked for comfort, and they have received geology in such indigestible chunks as to send them to bed with mental dyspepsia.

A narrow band of schistose rocks is flanked by granitoid-gneiss; in these schists occurs a connected series of thin lenses of gold-bearing quartz, forming lodes which conform in the main to the structural lines of the enclosing country; the latter has undergone complex folding and along the crumpled folds the lodes are enlarged into ore-bodies. Rock of unquestioned eruptive origin is said to occur in dikes, which affect the distribution of the gold.

In the discussion it was suggested that the reefs are bedded deposits which have been folded into a syncline, and consequently they have a better chance than if they were "true fissure" veins; but then, another gentleman said, they occupy a synclinal which has been faulted by a series of thrust-faults, and therefore the outlook is serious. Someone else remarked that there is the chance of their being cut off by the underlying granite, and finally, as if to disquiet further the slumbers of the average shareholder, the question was mooted as to whether the schists are of sedimentary or igneous origin.

Looking at the matter from this distance it does not seem to us that the Kolar goldfield is in any danger peculiar to itself; all lodes die out sooner or later; if they persist, they must eventually encounter a change of rock; all are endangered by faulting; it is decidedly late in the day to hark back to that geological dodo the "fissure-vein," and it is obvious—from the data to hand—that whether the Dharwar schists occupy a syncline or not, whether the quartz veins conform to the bedding or not, their very existence as depositories of gold ore is due to the faults, dikes and other rock-fractures which have created a passageway for mineral solutions and afforded a communication to regions of greater chemical activity.

It is the actualities of geological structure surrounding those parts of the veins now being worked which concerns the miner, and whether the veins be bedded or fault-fractures, whether the enclosing rock be sedimentary or intrusive, and the granite one mile or ten miles deeper—all of this is of small moment; whichever of these conditions exist, they have been apparently by no means unfavorable to the occurrence of large bodies of rich ore, and, when a change does come, it is more likely to be in connection with agencies dependent upon the groundwater than upon those points of general geology which have formed the main questions under dispute. When the deep workings begin to get dry, you can expect the beginning of a change in the character of the ore. The distribution of the groundwater is modified by structural conditions, among which faulting and other disturbances are not unfavorable factors, as is assumed, but quite otherwise. However, we will not pursue the subject further, because we fear to arouse anew anxieties which it has been our aim to allay. It remains but to advise the management of the successful group of mines on the Kolar gold-field to pursue a policy of vigorous development to the end that the testing of unexplored ground—below and ahead of their existing reserves of ore—may set at rest as much as possible those uncertainties which detract from the value of mines as investments.

BITUMINOUS COAL MINERS' WAGES.

The recent failure of the representatives of coal miners and operators to agree on a wage scale for the year beginning April 1, at the Indianapolis meeting, has called forth considerable comment from the daily press. In the main this comment has shown a commendable clarity and sanity of mind in striking contrast with the intellectual obfuscation that prevailed among the editors of the same papers during the conferences of miners and operators that preceded the great strike of the anthracite miners in 1902. This is probably because the public has had the opportunity to find out that it is paying for all the advantages the miners gained by that strike, and the daily press is aware that a strike undertaken with the avowed purpose of increasing the cost of fuel or of maintaining prices to an artificial level would not be popular. Doubtless there are, among the able leaders of the United Mine Workers, men who have the same conviction, whatever they may say for publication.

That the coal operators, who have come in for rather more than their share of the abuse directed indiscriminately at all combinations of producers, will welcome this change of attitude goes without saying, for it assures them a fair hearing, something that many newspapers virtually refused the anthracite operators in 1902.

The convention at Indianapolis adjourned without an agreement on a wage scale because the representatives of the miners would not consent to any reduction in wages. Propositions and counter-propositions were made and discussed, the final demand of the miners being for a re-affirmation of the 1903 scale, while the operators asked for the 1902 scale, which would mean a reduction of wages of about 12 per cent. The published accounts of the addresses made at the convention show that speakers on each side used conciliatory terms, refrained from harsh language and regretted the possibility of adjournment without agreement, with the chance of a strike later. It should be noted, however, that the operators based their demands for a lower wage scale on existing industrial conditions, depressed markets, the competition of coal from

regions where wage reductions had already been made, and the low prices for coal. The miners based their demands for the existing wage scale largely on the assumption that lower wages, and consequently lower costs of production and selling prices, would not lead to a greater consumption of coal than the maintenance of high wages.

It is scarcely necessary to examine at any length the merits of the case, as it now stands, since the obvious facts are all with the operators, and it does not appear that the miners undertook to support their assumption by citing facts. It is enough to point out that Indiana and Illinois coals which sold at $2 to $2.25 per ton in Chicago on February 1, 1902, when the 1902 scale was adopted, sold at $5 to $5.50 in 1903, and $1.75 to $2.10 in 1904.

It is probably safe to say that the reasons why the miners, according to their representatives, will strike rather than accept the 1902 wage scale can be easily surmised, even though they do not appear in the published accounts of the addresses made at the convention. They are as follows:

There must be no backward step in wage scales or the cause of unionism will be greatly damaged. It is likely that a majority of all the members of trade unions in this country look upon the establishment and maintenance of a high wage scale as the chief end of unionism, even though, owing to the inability of employers to pay such wages, a union man may work less than half time and earn less in a year than a non-unionist in the same calling. This must be particularly true of a union containing many thousands of comparatively unskilled and uneducated men. Unless a labor agitator can show that wages are increased, or at least maintained, as a result of the unions' activity, he cannot expect to get a following at a time when pay is good.

Another thing that probably influences the United Mine Workers in resisting is that in the last few months the strikers in Utah and in southern Colorado have gone against the coal miners' unions, and it has not been able to get back the influence lost in West Virginia after the failure of the 1902 strikes in several districts there.

Why, then, should the leaders of the United Mine Workers talk of a great strike in Indiana and Illinois, when it might end with the wreck of the union? The answer is that this is a Presidential year. There are certain newspapers and certain politicians that would welcome, from purely selfish motives, all the useless waste, all animosities that accompany a strike. Being unable to appeal to men who think clearly they may seek to provoke a conflict that they may appeal to men blinded by prejudice or passion. The 1900 strike in the anthracite regions was won by the miners because the operators yielded to political influence. The chief reason for hoping that the situation in the coal-fields of the Central West may not result as did the anthracite situation then, lies in the fact that since 1902 the public has had so many examples of the impudence, unreasonableness and venality of some labor leaders that its attitude toward the demands of unions is far more critical than in 1900. The present outlook does not favor a widespread strike of bituminous coal miners by April.

A MISLEADING STATEMENT.

IN the *Detroit Tribune* of January 22, the secretary of the American Security & Trust Company is quoted as stating that this JOURNAL gave an unbiased opinion concerning certain of its claims in Arizona. This is misleading. A correspondent at Tucson sent us a letter describing a discovery made in that region, and believing it to have been written in good faith, we published it in the correspondence department of our issue of December 17. It now appears that the writer of that letter is in the employ of the company which is using the information, but instead of quoting him, they quote this JOURNAL; although, at the head of the correspondence column we publish an express disclaimer of responsibility for the statements and opinions, which may be advanced by writers therein. The practice is entirely wrong and does no credit to the company concerned.

GERMAN IRON PRODUCTION.

We have heretofore referred to the fact that the German iron makers last year passed those of Great Britain, and that Germany has now taken the second place among the iron-making countries of the world. The great advance in production made last year was due partly to increased activity at home, but in large measure to the growth of the export trade, which was pushed by the large syndicates in every possible way, German iron and steel being offered abroad at prices with which other countries found it difficult to compete. This foreign trade is materially assisted by the syndicate system, under which manufacturers receive certain rebates and allowances for all material sold for export. Whatever more opinion may be entertained of the true policy of such an arrangement, it is evidently successful for the time in securing trade.

The total production of pig iron by the German furnaces is reported by the German Iron & Steel Union as follows, in metric tons:

	1902		1903	
	Tons.	Per ct.	Tons.	Per ct.
Foundry iron	1,619,275	19.2	1,798,773	17.8
Forge iron	1,206,550	14.4	859,253	8.6
Steel pig			703,130	7.0
Bessemer pig	387,334	4.6	446,701	4.4
Thomas (basic) iron	5,189,501	61.8	6,277,777	62.2
Total	8,402,660	100.0	10,085,634	100.0

The changes in production, as compared with 1902, were as follows:

	Tons.	Per ct.
Foundry iron	179,498	11.1
Forge iron and steel pig	355,833	29.4
Bessemer pig	59,367	15.3
Thomas (basic) pig	1,088,276	21.0
Total	1,682,974	20.0

In the classification above, for 1903, steel pig includes spiegeleisen, ferro-manganese, ferro-silicon and all similar alloys employed in steel making and the like. Previous to 1903 such material was included under the head of forge iron.

A considerable quantity of Spanish and Swedish ore was imported into Germany during 1903, but the greater part of the production was from domestic ores. Germany has the advantage of large deposits of iron ore in different parts of the country; by far the most important of these is found in the minette ore basin of Luxemburg and the adjoining country. These ores are generally low grade, but have the advantage of being in large degree self-fluxing, requiring, therefore, only small quantities of limestone in the furnaces. The Germans, moreover, more than any other nation, make extended use of all by-products of the furnaces, and are thus able to keep costs down to a comparatively low figure.

MARKET CONDITIONS.

February 17.

The metal markets generally show somewhat more activity than for two or three weeks past, and business is improving.

Copper is firmer at a slight advance. There has been considerable buying by manufacturers, and foreign consumers are also taking larger quantities than had been expected. The strike at the Champion, Baltic, and some other mines in the Lake Superior district is interfering with production.

Tin is somewhat easier. There is about the usual consumptive demand here, but the speculative movement abroad is rather slow.

Lead is quiet and unchanged, with about the usual business.

Spelter is firmer, demand continuing good. The smelting works of the Cherokee-Lanyon Company, at Gas, Kan., are reported destroyed by fire. The ore production in the Joplin district has been restricted by severe weather, which also interferes with the transportation of ore to the smelters.

Antimony is very firm, owing to the probable cessation of shipments from the Japanese mines on account of the war.

Silver shows little change, though buying for the East continues very good.

The iron and steel trades show a little more activity, and some new orders for finished material, especially bars and structural shapes, are noted. Pig iron continues on a low level.

The Western coal markets are still affected by very severe weather, increasing domestic demand, while factory sales are not heavy.

The seaboard bituminous trade continues rather quiet. Coastwise coal is hampered by ice, and demand is nowhere heavy.

The anthracite trade is affected by the continued cold weather, which makes retail buying active all over the country, and insures a good wholesale demand through February.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

Commercial potassium cyanide often contains silver as an impurity; this is derived, probably, from silver vessels used in the manufacture of the cyanide.

An excessive use of potassium cyanide, in cleaning amalgamating plates, hardens them, and renders them unfit to catch gold.

To soften the copper plates used in a stamp-mill, so that they will retain a good coating of amalgam, they should be annealed by applying a gentle heat, enough to cause dry wood or sawdust to smoke.

When copper plates become easily covered with a tarnish, due to oxidation of the copper, a remedy may be found by placing strips of iron or zinc on the plates. These should be heavy enough not to be moved by the passing pulp; their effect is to start up a galvanic action which decomposes the "verdigris" or green discoloration prejudicial to amalgamation.

The slimes produced in electrolytic copper refining usually carry from 15,000 to 20,000 oz. silver and 4 to 200 oz. gold per ton. The copper content ranges from 10 to 40 per cent and is made up of metallic copper, oxide, sulphide and sulphate.

The gas engine is essentially a modern device, but it was foreshadowed, in principle, over 200 years ago by a French savant, who proposed to construct a motor that would utilize the explosive force of gunpowder.

There is a strong tendency in the mind of the average director of mining companies to regard the working cost per ton as the sign and seal of good management, without reference to the complicated questions which arise in the settlement of the line of policy best adapted to make a given mine yield its maximum profit.

To compare the working costs of one mine with those of another is often palpably illogical. The costs of different mines, situated in different sections, and with quite different problems to solve, can no more reasonably be compared than their respective yields can be.

The element uranium, occurring in pitchblende, was discovered by Klaproth in 1789, and first isolated by Peligot in 1842. It is closely related, chemically, to chromium, tungsten and molybdenum.

Natural gas is a mixture of elementary gases and gaseous compounds. The compounds of the paraffine group are the most important, and usually constitute from 90 to 95 per cent of the total volume. Among the gases present in small quantities are: nitrogen, hydrogen, oxygen, carbon dioxide, ammonia and hydrogen sulphide.

MODERN ENGINEERING.*

By R. W. RAYMOND.

What is engineering? The control of nature by man. Its motto is the primal one—"Replenish the earth and subdue it!"—not merely depend upon it, like a stationary plant or roaming beast, or hunting savage, taking what it gives—but change it by creative work, and use it with sovereign skill. Is there a barren desert—irrigate it; is there a mountain barrier—pierce it; is there a rushing torrent—harness it. Bridge the rivers; sail the seas; apply the force by which all things fall, so that it shall *lift* things. Recover the solar energy long stored in black darkness to reinforce the sunshine of to-day with heat and light and power. Nay, be "more than conqueror," as he is more who does not merely slay or capture, but makes loyal allies of those whom he has overcome! Appropriate, annex, absorb the powers of physical nature into human nature!

In the execution of this primal command, the use of machinery has been the factor and measure of progress. It is a truism to-day that the most civilized nation is the one which uses the most coal. Probably that will not always remain as accurate a test as now. Regions which have no coal may come to utilize water-power, and its transmission by means of the electric current, so as to realize something of the benefits of modern engineering. So I will not say that it will always be the country that uses the most coal, but I think it will always be true that the nation which is foremost in the utilization of some natural power will be also foremost in every branch of human progress.

I have given a definition of engineering; let me give a definition of machinery, the use of which, in my judgment, is intimately connected with even the highest spheres of human progress. What is machinery? It is any means by which man's individual powers are reinforced for the conquest of nature. Tools are the simplest forms of machinery. The hand-hammer makes one man's arm twice as long, the steam-hammer makes one man equal to hundreds; and each of these enlargements of the powers of man is directly in the line of his achievements in the conquest of nature. One man cannot make much. I fancy that it takes at least two men to make anything important. I don't think Robinson Crusoe was much of an engineer until he had Friday to help him; and when they got together they produced but a pitiful kind of engineering. You and I know that no man ever lived who could become a great engineer on a desolate island. Men must be brought together with men, must trust one another, must reinforce one another with their thoughts; and many men, the dead as well as the living, must combine to make a machine. But besides bringing to pass all the great mechanical agencies of machinery, engineering brings together men in making machinery of a higher order. We talk about governments and customs, classifying them as "conventional" as opposed to natural; but the machine which is born of a man's brain is just as truly his son as the child of his body. The machines of organization, whereby one is not made equal to 100 or 1,000, but thousands are made to act as one, are the complement of those physical machines which have been created by inventors. Such organizations are also born of the generations, and are truly their children.

In view of these considerations, the problem of education is a progressive one. In some respects it presents analogies with the process of development in the vegetable and animal world by what is called natural selection. In that process the end sought is fitness; that is, the adaptation of each species to the conditions in which it must struggle to live and reproduce itself in successive generations. Not, as was once piously believed, the divinely-ordained and perfect adjustment between the individual and its environment, but an equally divine perpetual lack of adjustment, requiring endless modifications, is the secret of the universe about us. Each new set of conditions brings about a necessary new combination of specific characters, and these have scarcely been perfected, when new conditions restore the old lack of harmony, and demand new features of fitness. In this endless procedure, the simple, ruthless method of nature is that of sifting. The fittest are saved; the unfit go into the waste heap of the universe—into what Milton called the Limbo of Vanity—the dumping ground of mistakes, failures and abortions. Meanwhile, the survivors go on, reproducing on the whole, though with imperfect certainty and emphasis, the peculiarities by virtue of which they have survived, until their type also becomes unfit for new conditions, and passes into the Limbo of Vanity. Among plants and animals the field of fitness comprises only the ability to obtain food, overcome or avoid the hostility of climate, or of competitors and enemies, and to reproduce, and start upon a similar task, the next generation of the species.

Now, there is a good deal of this process left in human affairs. We, too, enter a struggle for life, in which the unfit go to the wall. And, in our attempt to modify by education the severity of the process, and to accelerate the slow sifting which casts away whole generations in the evolution of superior types, we encounter the same phenomenon; that fitness is relative, not absolute; that a continually changing environment demands a continued change of armament; that the adjustment reached yesterday is not, cannot be, ought not to be, the solution of the problem for to-day and to-morrow. Moreover, we realize that in this higher realm of evolution the end of adjustment is not merely capacity to obtain food, rear offspring and then die. For what is the species which we seek to perpetuate? Not an animal form merely, which can eat, fight or hide, or run away, nurse children and die. No! the species is *progressive* man, linked in his origin with the grass and the beast, but in his destiny with the universe and its Creator.

*Extract from address delivered at the opening of Williams Hall, Lehigh University, October 8, 1903; by Dr. R. W. Raymond, Secretary of the American Institute of Mining Engineers.

Depreciation in mine accounts may be stated as an amount calculated to represent the periodic diminishing value of plant, machinery and other assets, to be regularly charged against the book value of the same. The amount varies in direct ratio to the estimated life of any given asset. It is, therefore, impossible to establish any set general rule to fix the amount; but, in view of the great variety of plant, it may be necessary to generalize to a certain extent, in order to avoid undue complexity in the accounts.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the ENGINEERING AND MINING JOURNAL.

MINE SAMPLING.

The Editor:

Sir.—Mr. R. Gilman Brown's communication in the JOURNAL of January 28, relative to retaining certain portions of samples for a group assay, prompts me to cite a rather different practice that I have followed for a number of years, giving me considerable satisfaction and mental ease, if no additional information.

As soon as the samples have been prepared for the assayer, a certain amount of the pulp is set aside, its weight being proportional to the width of the vein represented by that sample. When it has been determined what samples are to be included in a given block or group, the reserved portions are thoroughly mixed and assayed. If no errors have been made in assaying the original samples, if they have not been tampered with, and no errors have been made in the calculations, the result checks closely with the estimated value of the group.

Mr. Brown points out the difficulty of taking the rejected quarterings in their coarse condition for a check or group sample, a difficulty that does not present itself in proportionally dividing the pulp.

I recognize the fact that, in not setting aside the proportion of the sample until it is reduced to pulp, additional time and facility is given for tampering with the samples, and their value as checks is correspondingly reduced. But for this matter, if the rejected quarterings are retained in coarse condition until it is decided what should be combined in each group, a decision that is frequently not reached until after the first assays are made, the same objection holds, because of the difficulty of protecting large samples.

F. F. SHARPLESS.

Westbury, N. Y., Jan. 30, 1904.

BUREAU OF MINING.

The Editor:

Sir.—The editorial in your issue of January 14, advocating a fair representation of the mining industry in the work of the United States Geological Survey, is a hammer blow in the right direction. If a goodly percentage of the profession could but devote a little of their time to wielding their little hammers on the spot so well indicated by your initial tap, possibly the unwieldy ingot of departmental scrap metal may be forged into a more useful shape.

While the establishment of a definite Bureau of Mining is, without doubt, an urgent present need, the future goal of a Department of Mining should never be lost sight of by the mining fraternity. Not only the directors of mining enterprises, the managers and the mining engineers, but their forerunners in the field, the prospectors—of romance and stern bacon-and-beans reality—need the aid of the scientific specialists of the Geological Survey. The delays in the preparation of the folios and special reports of the Geological Survey are to be greatly deplored; and the suggestion of Mr. Benj. B. Lawrence, that special pamphlets be issued in advance of the final reports, is a most excellent one. With the present equipment of the Survey such a course of procedure would be almost an impossibility; but with a special bureau, and, what is particularly essential, a liberal slice of a special appropriation, these pamphlets may be prepared in such form as to be of great benefit to all mining men of reasonable intelligence. There are, of course, many miners and prospectors who would scorn to avail themselves of literature prepared by "them scientific chumps" (the type of willow-wand wielder, for example); but nevertheless there are many practical men, of limited education, who would welcome a series of pamphlets which they could read and understand, describing and explaining the rock phenomena of the district in which their work lies.

The only way that legislation can be obtained is to persistently call the attention of the worthy gentlemen at Washington that it is up to them to do something. Every reader of the JOURNAL should take up a cause like this as a personal matter, but, how many will find time to do so? As an effective means of aiding them in this step, I would suggest that the JOURNAL prepare a leaflet, stating briefly and emphatically just what legislation is necessary, and in such a form that readers may add a few lines personally and forward to their respective Congressmen. Backed up by an urgent editorial, an appeal could thus be made which even the busiest reader would not ignore.

WM. B. MCKINLAY.

Delta, Idaho, Jan. 29, 1904.

The Editor:

Sir.—Your editorial discussing the advisability of establishing a Bureau of Mining is timely, as it brings many things concerning the United States Geological Survey to public attention that of late have been ignored. The particular point I think should be emphasized and discussed is whether the Hydrographic and Reclamation staff should continue under the guidance of the Survey or be placed where I feel it should go, namely, to the Department of Agriculture.

In order to properly understand the relative importance of the various divisions of the Survey, I wrote to the Director, asking for information, and received promptly the following letter:

"Sir:

"In response to your request contained in letter of January 9 there is submitted below a tabular statement giving the number of persons at present on the regular rolls of the Survey, grouped in the manner you indicate:

Whole number of persons holding regular appointments, about		750
Number of geologic staff (of which the economic geologists number 58)	100	
Number of hydrographic and reclamation staff (engineers, hydrographers, etc.)	194	
Number on topographic staff	94	
Number on forestry staff	3	
Number on chemistry and physics staff	8	
Number on all other branches of work (artisans, statisticians, and general office assistants)	351	750

"In addition to this permanent force, with appointments from the Secretary of the Interior, a temporary field force is employed. The number of such assistants is constantly changing and it would be difficult to even estimate it.

"Of the 100 geologists, 50 per cent render only occasional service, and are paid only when actually employed.

"Very respectfully,

(Signed) "H. C. RIZER,

"Chief Clerk."

From this it is seen that the original plan of the founders of the Survey has been altered by causes the nature of which is not apparent. Why is it, if the Survey is to advance in its scope and usefulness, that the section of economic geology has not maintained its relative prominence, instead of being completely overshadowed by the reclamation, hydrographic and topographic staff?

It is certainly not because the mining industry has retrograded or become in any way of less importance to the world to-day than when the Survey was first planned by its wise and intelligent sponsors; it is unnecessary to offer statistics showing the conditions as they have existed for the past five decades; we all realize the importance of the industry, and can only wonder why those in authority over the Survey should so alter the complexion of its staff.

The reclamation and irrigation of government lands surely belong to the Department of Agriculture, as such work cannot be fairly thrown upon geologists; it would seem just as rational to place economic geology in the Treasury Department because the product of precious metal mines is used in coinage; it is not that the former work is decried or belittled; it simply is that the work is placed in the wrong department, and, should we succeed in placing this work where it properly belongs, in my opinion, the crying need for room and space in the building now controlled by the Survey might in a measure be met.

Any visitor going through the rooms of the Survey (other than those of the Director and Administration Staff) is sure to be struck by their chaotic condition—a condition brought about by the compression process, whereby the building must house those engaged in the service of the Survey. The character of the work intrusted to, and executed by, the faithful and brilliant members of the Survey, warrants the belief that they are entitled to reasonable comfort while engaged on their office work, and to freedom from annoyance by reason of the noise that cannot now be avoided so long as the present crowded condition continues; these men are justified in expecting and receiving from our Government the same academic quiet that obtains in any of our leading universities where similar work is performed.

The foregoing is one of several reasons why we should have a separate department for mining, and the various interests that attach to it; we should have, as the interested head of such department, a man thoroughly in accord and familiar with the current practice in mining-land matters, and we would then be spared the exasperating position in which those of us who hold patented claims now find ourselves. No one familiar with mining practice could ever sanction the recent rulings of the Land Commissioner, much less issue such an order as was given by Mr. Binger Herman on June 17, 1899. An illustration of the practical workings of this order in Colorado is seen by reference to Section 4, Town 51 N, Range 6 East of the New Mexico principal meridian; here, by error of the deputy surveyor, a section was reported to be three-quarters of a mile north and south, when the stakes upon

the ground showed that section to be one and one-quarter miles north and south; the various patented claims in the northern part were tied to the two upper corners, and those in the southern portion to the southern corners; the result, when platted in the Land Office, showed claims which, on the ground, were 2,000 ft. apart, *to be in conflict nearly their entire length!* This is a specific case of hardship, while, as a matter of fact, the titles to thousands of patents will now have to be brought before the courts, and the rights thereby conveyed will have to be construed before it will be possible to deliver clear titles to mining claims; the hardship this will work is almost incalculable; the working of this ruling is not a theory, but a disastrous fact that faces us all.

With a separate department, whose affairs solely concern the mining industry, such a ruling would not be permitted, and the matter would receive the sympathetic hearing of one interested in promoting the real welfare of the mining community, instead of endeavoring to compile a series of fictitious maps and plats.

RICHARD A. PARKER.

CYANIDATION OF SANDS.

The Editor:

Sir.—I should like to say a few words upon the remarks of Mr. Johnson, appearing in your issue of December 31, regarding the article by Messrs. Butters and Crank in the JOURNAL of December 5. I have expected that the authors of the paper would reply to Mr. Johnson, but since they have not, I must presume that their time has been too much occupied to do themselves the justice of making a reply, hence I take the liberty of stating a few facts regarding the cyaniding of sands which must have escaped the notice of Mr. Johnson.

In a plant having separate sand and slime treatment, the primary and necessary step toward successful results is the absolute separation of sand from slime. Sand is sand, no matter how fine its state of sub-division, and slime is slime, however difficult it may be to define in words. Mr. Johnson's machine, efficient as it is undoubtedly in its sphere, will not fill the requirements. I cannot believe that a wheel such as Mr. Johnson describes will take from pulp, coarse sand, and sand that has been crushed fine enough to pass a 200-mesh screen, at the same time leaving nothing in the water but pure slime. This, however, is definitely accomplished by the collecting tank with Butters distributors and slime gates, aided by the spitzkasten. The spitzkasten takes out any fine sand that may have been allowed to escape through the slime gates of the collecting tank. And this is accomplished without the use of power. The use of the Blaisdell excavator and centrifugal distributor has another and quite different object in view. Aside from the economy and speed of working with the machines, it may be briefly stated as follows: The *desideratum* in transferring sand is to have as much of the material as possible exposed to the action of the air for oxidation. The Blaisdell excavator accomplishes this by paring off thin slices of the material, turning it over and over while delivering it to the conveyors, and the centrifugal distributor completes the work by flinging the sand in a sort of fine spray in the receiving tank. In this way practically every particle of sand is exposed to the air for oxidation, to the great benefit of subsequent cyanidation.

Mr. Johnson's machine is certainly a very useful one where, as he says, "the bulk" of the sand is to be removed from the pulp, but it can hardly be expected to take out all the sand, coarse and fine. Nor does it seem adaptable for use as an excavator in a round tank, even if thorough oxidation were not such a prime requisite. For these reasons, then, Mr. Johnson's ingenious invention can hardly take the place of the more expensive Blaisdell machinery.

HERBERT A. MEGRAW.

Copala, Mexico, Jan. 30, 1904.

THE DAVIS CYANIDE REGENERATION PROCESS.

The Editor:

Sir.—I note a correction by Mr. George Collins concerning my statement regarding the discontinuance of a cyanide regeneration process at the mill of the Smuggler Union Mining Company. In view of the fact that this discontinuance is denied by the inventor, Mr. W. H. Davis, in a letter to me, and also by Mr. Collins and Mr. Wells, the general manager of the Smuggler Union Mining Company, as quoted by Mr. Collins, I can but admit that I have made an error in stating the fact as I did.

The information was given to me by a friend of mine, whose name is in the possession of Mr. W. H. Davis, and who, very shortly before the article was written, visited many cyanide mills in Colorado and other States, in order to get certain information for his own purpose. He visited the Smuggler Union plant and there gained the information in question, which was given to me in conversation. He was probably misinformed at the plant, or misunderstood the situation.

CHARLES H. FULTON.

Rapid City, S. D., Feb. 8, 1904.

THE DEPOSITION OF ORES FROM AN IGNEOUS MAGMA.

The Editor:

Sir.—As you have done me the honor of publishing my letter in your issue of December 10, I take it for granted that you are not adverse to a further discussion of the special case to which reference is made therein. This subject of the differentiation and deposition of minerals (by crystallization or otherwise) from an igneous magma is, as you have justly remarked, one of the greatest importance to the mineralogist and geologist, and, consequently, in its application to the technical engineer also.

Although theoretical principles, like cornerstones, should accompany the building of every theory, yet the facts learned by observation in the field, as well as those by experiment in the laboratory, are all necessary to make a theory conform to nature. There are so many different methods by which similar results may be accomplished, that it requires not a little study to know how nature does it; and, as that is the method we wish to ascertain, it behooves us to analyze and experiment along the same lines that nature appears to work.

The history of mankind shows how difficult it has always been to prevent the specialist from generalizing and philosophizing along his own special lines, thinking that his method must be nature's also. We know how the mathematicians controverted the true mechanical theory of the ancients that "the sun was the center and the planets revolved round him," and by their epicycles demonstrated the very opposite to be the truth.

And in a similar way the mineralogist, by the use of chemistry, can freeze crystals at certain definite temperatures, and by that means try to prove that a liquid magma, containing these minerals, must necessarily have been at that high temperature at some previous time; little dreaming that nature can liquefy crystals and form magmas at one-tenth of the temperature that the chemist figures on.

If we find a mountain of granite in the center of upturned sedimentary strata, we conclude that the granite is an eruptive magma; and the mineralogist, using the chemical principles (which Prof. Kemp has given in his letter), says that the eruptive magma must have had an igneous-molten origin, because the minerals must first have been fused into a liquid menstruum, then crystallized into a magma.

Now if, at another place, we found the same granite and the same strata, with the physical difference that the strata was turned down toward the granite instead of up, even in spite of that difference we would still adhere to the principle that granite is an eruptive magma. The difference of conformation shows that there has been some additional cause other than that of eruption. And the duty of the geologist is to find that cause, and in the finding of that cause many other facts may be revealed. The theory that every magma of a granite character is eruptive is so well established by observation that wherever the geologist finds granite he knows it belongs to, or has been detached from, some eruptive magma, and, being eruptive, the supposition is that it must be of igneous origin.

So strong is the belief at present in the Archean or igneous origin of all eruptive magmas, that it would be pure heresy to say that an eruptive magma had its origin in the Silurian, Carboniferous, Triassic, Jurassic, etc., formations, and it would appear ridiculous for any engineer to say that by sinking a vertical shaft deep enough to go through the granite, it would reach sedimentary strata beneath it. If granite was found under these conditions, the miners would call it 'floating' granite.

It is quite customary to find floating eruptives, such as greenstone and basalt; and, as they have the same physical characteristics as granite, I might ask, "Why should we not expect to find some good workable seams of coal under granite as well as under basalt and whin?" I have known many square miles of country covered with mountains of whin, underneath which some of the finest coal-beds in the Carboniferous formation are now being worked.

It is to mineralogy that we must look for the tests by which an engineer or geologist can distinguish an igneous eruptive magma from a secondary, or aqueous, eruptive magma. Thirty years ago the engineers had to fight against the influence of the geologists in persuading capitalists to drill through an eruptive rock, such as whin and basalt, to find coal and bituminous strata in the Carboniferous formation. We were in the same position then as we would be now if we were to ask New York capitalists to drill through gneiss (the gneiss of Manhattan Island, for instance) to find the coal measures beneath it.

What I propose to do is to prove that granite, trachyte and the lavas may all be of

a secondary character, and that beneath them may be found the stratified measures. While there are magmas of igneous and Archean origin, I would like the mineralogists to tell us how to distinguish a secondary from a primary magma.

It may appear at first sight as if I was neglecting the principal object of the discussion, viz., the subject of Prof. Kemp's letter; but I believe it is necessary to settle the question of the character of a magma before attempting to explain the differentiations of minerals from a magma. For if there are differences not only in the chemical, but also in the physical constitution of those magmas that are classed as igneous, then, before we can explain the differentiations and deposition of minerals from a magma into veins, we must first know whether the magma in question is a primary or a secondary one.

I would distinguish between a primary and a secondary magma by the following definitions:

A primary magma is an igneous, one-time molten mass of minerals. A secondary magma is an aqueous-igneous mushy mass of minerals. The one has been fused by heat, the other has been dissolved by solution.

When Prof. Kemp tells us that the fusing-point of a certain crystal is 1,500° C., he does not wish us to believe that the same crystal cannot be dissolved into a liquid by aqueous solution at a much lower temperature than that. Now, I hold that if we wish to discuss the *natural* cause of differentiation, we must first know whether the magma contains the minerals in a fused or mushy condition.

If we take water under a pressure of ten tons to the square inch, it does not require a very high temperature to dissolve every known crystal. Then, the variation of pressure and temperature would play a very important part in differentiation and deposition. Now, we know that nature sometimes works under such pressure in the generation of magmas, so that the laws of igneous fusion, as given by Prof. Kemp, may be neglected under such conditions.

The case which came under my observation a short time ago, in the Seward Peninsula of Alaska, is of such a typical character, in regard to the geological and mineralogical conditions accompanying the veins of the precious metals all along the Pacific Coast, that I was much struck with the similarity, and will try to describe it as correctly as my observation and ability will permit.

Almost in the center of the peninsula there is a range of granite mountains (locally called the Saw Tooth range) whose axis lies approximately in a northeast and southwest direction. To the south of the most westerly portion of the range lies the mining district of Cape Nome.

I was much struck with the similarity of the bed-rock to that around Columbia and Mokelumne hill, in California. There were the same mica schists, chloritic slates, porphyries, greenstones, partially transformed lime-rocks, and marble; but the serpentines, the floating lavas and the granites and syenites were wanting, and the rocks all dipped at a very steep angle. And from the description given of the region to the northwest of the mountain range by Messrs. Brooks and Collier, of the United States Geological Survey, the stratigraphical outcrop corresponds with that of the Nome district to the north.

Those who wish to read a detailed description of the region should read the 'Reconnaissances' of Messrs. Brooks and Collier, published by the United States Bureau, and which I can recommend for accuracy of observation and description, although I differ considerably from them in their opinions of the causes of the geological and mineralogical phenomena, which they so correctly describe; but space will not permit me in this letter to give my interpretations of the causes which have produced that configuration of conditions, and I shall have to trespass on your kindness for another letter.

ROBT. STEVENSON.

New York, Dec. 16, 1903.

NATIONAL MINING BUREAU.

The Editor:

Sir.—A National Mining Bureau has been a subject of recent discussion among engineers. Heretofore the subject has been discussed rather casually, and although its advantages have been admitted, it has been treated as a future possibility rather than a matter worthy of present serious consideration.

The object of this communication is to set forth in a general way some of the various possible benefits to be derived from such a bureau, and more particularly to open the subject for discussion so that mining engineers may state to what extent they could and would co-operate with such a bureau if it is organized.

The following are suggested as possible benefits:

1. The bureau could have a department prepared to determine and classify any mineral or rock. This department should be thoroughly equipped to make accurate and rapid determinations so that the results of such determinations might be imparted with the least possible delay. The advantages of such a department to the prospector are obvious. Moreover, a mining engineer is frequently unable to determine definitely a mineral or rock in the time at his disposal for making a report. In such a case he usually resorts to such general terms as 'eruptive' or 'sedimentary,' whereas he might obtain from the bureau an accurate determination in a very short time, which would enable him to be more specific in his report.

2. Information of a general nature which shows the occurrence of ore-bodies, with their enclosing formations, in mines of established merit, is often of interest to operators or prospectors studying or seeking deposits of like nature. Such information could be obtained from mine owners and superintendents who would gladly furnish it provided nothing of a private nature was desired.

3. The bureau might provide information regarding the distribution and production of various mineral substances and their producers in the different States, including all common metals, deposits of quicksilver and platinum, coal-lands, oil-lands, saline deposits, rare minerals, gems, etc. Such information might be kept up to date by correspondence with every known producer with regard to the amount and value of his output. Information and statistics of this nature might be presented in the form of printed bulletins or pamphlets, brought up to date at regular intervals.

4. Catalogues, revised from time to time, might be compiled which would give accurate information regarding reputable mines, mining properties and mining companies. Statistics regarding mining swindles might be gathered, and all disreputable stock companies listed.

5. Information regarding different classes of mining machinery and devices used in saving mineral substances might be catalogued, together with a list of reputable manufacturers of mining machinery and appliances. The manufacturers themselves would gladly aid this department by furnishing desired information.

6. Labor statistics might be gathered, such that mine-owners and operators in need of any class of mining labor could be referred to the proper employment departments of the State mining bureau.

7. Arrangements should be made for a complete reference library of all publications of statistical notes relating to mining, published by the various States. A library of this character would form a valuable fund of miscellaneous mining information.

It is probable that such a bureau would be closely connected with the United States Geological Survey, or form a prominent department thereof. It would no doubt keep closely in touch with the State mining bureaus, secure the co-operation of the State geologists and the various mining institutes, engineering societies and State scientific societies. In some subjects its benefits would be somewhat similar to those of the State mining bureaus. Obviously, however, its investigations would be conducted on a much larger scale. It would be to the United States what the State bureau is to the State.

Engineers, mine operators, prospectors and that portion of the general public interested in mines and mining would feel, sooner or later, the advantages of a national mining bureau.

HARRY J. WOLF.

Telluride, Colo., Jan. 31, 1904.

Trachyte is from the Greek, *trachys*, rough. This rock usually has an uneven fracture, due to the angular sanidine and the porosity of the ground-mass.

Imitation gold, capable of being worked and drawn into wire, consists, according to a recent formula, of 950 parts copper, 45 of aluminum, and 2 to 5 of silver.

The 'blue ground' in which diamonds are found at the De Beers and Kimberley mines is called by Dr. Stelzner a breccia. Most of the angular edged or rounded fragments of this breccia are composed of a green-black or blue-black serpentine-like mass. Fragments of rock which are found in Karoo formation—such as sandstone, shale and diabase—are to be found in the 'blue ground.' There are also other rocks, in the shape of boulders, which are not known in the Karoo formation, and which doubtless come from a greater depth, possibly from the rocks upon which the Karoo beds lie. The mass of the 'blue ground' consists of olivine, more or less changed by oxidation, with the following minerals: Chromic diallage; bronzite; pyrope containing chromium; flesh-colored zircons, locally called Dutch bort; cyanite; biotite; chromite; titanium; magnetic iron; and, finally, small crystals of perofskite. In the 'blue ground' at the Jagersfontein mine corundum has also been found, with small crystals of tourmaline and rutile.

IMPROVEMENTS IN ROASTING FURNACES.

Frank Klepetko, of New York, aims to increase the efficiency of the McDougall furnace by increasing the number of stirring arms in each hearth chamber. If the blades on a single pair of arms be set in opposite directions, they will neutralize each other as to shoving the ore in or out, and will simply stir the ore. If, in a hearth having one pair of neutralizing arms, there be placed a third arm having blades disposed at a suitable angle to the radial axis of such arm, it will serve to feed the ore radially, but only as fast as did the first pair of arms before being neutralized by the reversed disposition of their respective blades; but, while the time of radial discharge will thereby be increased 50 per cent, the stirring action will likewise be increased 50 per cent, since there is the action of three arms instead of that of the original two. If the number of arms be increased to five, letting two pairs neutralize each other (thus getting the radial discharge of one arm only), the roasting time will be doubled while the stirring action will be increased 150 per cent. A similar effect would result from a still further increase in the number of arms, though it might not be practical on account of concentration of iron work at the center, or hub, of the cluster of arms. If it be not desired to increase the time of roasting, but simply to increase the stirring action, this can be effected by putting in four arms to a hearth and letting one pair neutralize each other, the two remaining arms operating to discharge the ore. In this case the time would remain the same, as there would be only two arms effective for the radial discharge or feed of the ore, but the stirring action would be doubled. Klepetko prefers, however, an odd number of arms, as three, since then not only the roasting time, but also the stirring action, is increased. (United States Patent 744,359, November 17, 1903.)

The most serious practical difficulty with the McDougall type of furnace, which has recently come into so extensive use, is its tendency to produce a very large percentage of flue-dust. The area of each hearth is comparatively small, and the small quantity of ore that is burned in a single furnace is subjected, by the successive drop from hearth to hearth, there being usually five or six hearths, to the strong current of gas going in the opposite direction, which carries off a great deal of dust. John B. F. Herreshoff seeks to reduce the percentage of dust carried away by arranging special spouts in the hearths, so that the ore will be delivered from one hearth to the next one below without having to fall through the openings in which the ascending current of gas is passing. (United States Patent 729,170, May 26, 1903.)

Charles H. Repath and Frank E. Marcy, of Anaconda, Montana, aim to accomplish the same results by arranging external flues, so that the gas current passes from one hearth to the next above through an elbow exterior to the main cylinder of the furnace, while the ore falls from one hearth to the next below through openings in the usual manner. (United States Patent 740,589, October 6, 1903.)

Franz Meyer, of New York, has patented a muffle furnace, which consists of a series of McDougall furnaces—for example, eight, erected in a block of two rows of four each. The lowest and next to the lowest hearths are muffled, the flame flues extending through the length of the block. At one end of the block there are two fire-places, one for each side, from which the products of combustion pass through the flues under the lowest hearths of four furnaces and return through flues above the lowest hearths, thence passing to the chimney. (United States Patent 731,114, June 16, 1903.)

Alfred Diescher, of Pittsburg, Pa., has patented a modification of the Ropp furnace, in which the rabbles are carried on rails at each side of the hearth, as in the Brown straight-line furnace. Two pairs of rack bars are arranged parallel with and adjacent to the rails. These bars are given a reciprocating movement by a suitable mechanism, whereby the rabbles are caused to move forward. Upon emerging at the discharge end of the furnace the rabble is gripped to a cable going around the furnace substantially as in the Ropp, whereby it is transferred to the feed end, preparatory to making another passage through the furnace. The cable for transfer of the rabbles passes through a tunnel under the hearth, but there is no slot in the latter, the design of the furnace being obviously to avoid that feature. (United States Patent 740,102, September 29, 1903.)

In another patent Diescher shows a furnace similar to the one above described, in which the rabbles are drawn by a cable extending around the furnace, as in the Ropp furnace, but inside of the furnace the rope is carried on idlers in a slot about at the hearth level. A rather complicated mechanism is required to bring the rabbles around the sharp curves at each end of the furnace, inasmuch as they are supported by wheels at each end, instead of the simple central support of the Ropp furnace. (United States Patent 740,103, September 29, 1903.)

THE LEAD MINES OF BALIA, TURKEY.

By GEORGES RALLI.

While Turkey is generally accredited with the possession of important mineral resources, this opinion is based largely upon the evidence of travelers and the few engineers who have paid a hasty visit to that country. The only mineral products that have found their way to any extent into foreign markets are emery and chrome ore, which are mined in the Asiatic and European coastal provinces. In recent years, however, foreign capital has entered the country, and there is every prospect that the construction of the railroads now planned or under way will be followed by active exploitation of its mineral wealth.

A beginning in this direction has been made by the Société Anonyme Ottomane, organized by French and Russian capitalists to take over the lead mines of Balia, formerly owned by the Société du Laurium. The company received title to the property in 1902, and has since started productive operations. The mines are situated in the *vilayet* of Brousse, Asia Minor, about 100 km. from the sea, with which they have not been connected as yet by railroad. A description of the mines may be found in Strabo, and they have been worked intermittently since Roman times by the races which have successively inhabited the country.

The ores are of complex character, consisting of galena, blende and pyrite, in a gangue of limestone and eruptive rock. On an average they carry from 16 to 20 per cent lead and 8 per cent zinc. The entire output of lead ore is converted at the mine into pig lead, which is exported.

The company's plant at Balia comprises a mill of 400 tons daily capacity for the production of lead concentrates, a Wetherill magnetic separator for making a blende product, and the smelting works which are supplied with a water-jacket lead furnace. The furnace is of rectangular section, 1 by 1.8 m., and has a daily capacity of 100 tons (75 tons ore and 25 tons slag). About 10 per cent of the charge is coke, but the fuel is poor in quality, containing 15 per cent ash and 10 per cent moisture. With good dry coke 8 per cent is sufficient. The slags produced contain 2 per cent lead, 20 grams silver and 10 per cent zinc per ton. An average extraction of 96 per cent of the lead and 98 per cent of the silver contained in the ore is made. The smelting costs, including the preliminary roasting, are about 60 fr. per ton of ore treated. Milling costs about 3.8 fr. per ton. The present rate of production approximates annually 10,000 tons of lead and 2,000 tons of blende. In 1903 the output was 63,000 tons of ore, yielding 7,600 tons pig lead with an average content of 97.5 per cent lead and 1,950 grams silver per ton; 4,000 tons galena, assaying 70 per cent lead and 1,400 grams silver, and 1,900 tons of blende, containing 41 per cent zinc.

The company owns a lignite mine, 20 km. from Balia, where an electric power-station has been installed. The generators have a total capacity of 700 h. p., and the current is transmitted by wire to the mines and works at Balia. The average cost of current per kw. hour is 0.09 fr., which is low considering the fact that the fuel is of poor quality.

As already mentioned, French and Russian capital is chiefly represented in the enterprise, although some stock is owned in Turkey. The capital of the company is divided into 9,000 shares of 500 fr. each, in addition to which 225,000 fr. in bonds have been issued. Payment has already been made on a portion of the bonds. The company employs about 1,800 laborers in the mines and works. The lead is transported to the sea-coast at an expense of 20 fr. per ton, and is shipped to Frankfort, Germany, for refining.

METEORIT.—This name has been given by the inventor, Mr. Rubel, to an alloy of aluminum containing from 4 to 7 per cent of phosphorus. This alloy has been patented by him in Germany and in the United States. It is claimed that the combination with phosphorus increases the tensile strength, toughness and hardness of the aluminum, so that it can be cast, rolled, hammered and treated in other ways very much the same as iron. It can be rolled into very thin sheets and drawn into wire having a tensile strength very much higher than that of pure aluminum wire, while the conductivity is but little affected. Castings and forgings of meteorit can be machined, polished and treated very much the same as iron or steel. It is also claimed that the alloy resists corrosion, and is not affected at all by salt water, and very little by acids. The patent, covering the manufacture of meteorit in this country, has been placed in the hands of Mr. E. May, of New York, who is preparing to introduce the material in the United States. It is now made in Germany.

RECENT PROGRESS IN WEST AUSTRALIA.

By J. H. CURLE.

The annual output of gold from West Australia has now reached $45,000,000. Roughly speaking, it is nearly one-half of the whole output of the United States and Canada, and, as an individual product among the countries of the world, is only surpassed by that of the Transvaal. On known data the yield must go on increasing for the next two years.

The area of the gold-field is immense; it is, I believe, over 1,000 miles long, and some hundreds wide. Much of it has never been prospected—hardly been explored—and there is no reason why, for many years to come, new mines should not be discovered and the output of gold indefinitely increased.

The headquarters of this immense gold-field is at Kalgoorlie, 350 miles inland, where, in an incredibly small area—about a square mile in

IN A WEST AUSTRALIAN MINE.

extent—are found seven or eight of the biggest gold-producing mines of the world. West Australia is best known by these big mines. In the following table I show the eight leading mines in the country and their present value based on their ore-reserves.

As at November 20, 1903.

Name of mine.	Market valuation.	Net profit in sight in blocked out ore-reserves.	Percentage of profit in sight to market value.
Oroya-Brownhill	$8,184,000	$9,215,000	112
Kalgurli	2,764,000	2,425,000	87
Ivanhoe	8,730,000	6,208,000	71
Perseverance	10,185,000	7,032,000	69
Great Fingall	11,216,000	7,517,000	67
Sons of Gwalia	3,321,000	2,037,000	60
Golden Horseshoe	13,450 000	7,857,000	58
Great Boulder	12,307,000	6,063,000	49
Totals	$70,166,000	$48,354,000	Av. 69

Of these mines, six lie together in the square mile at Kalgoorlie; the Sons of Gwalia is 200 miles distant; and the Great Fingall, 400 miles.

These eight mines are now producing $23,250,000 of gold per annum, just about half the country's output, and are earning a profit of $13,150,000. The average recovery value of their ore is $21.50, which, from mines aggregating over 90,000 tons output per month, is an extraordinarily high figure. The average cost of working, per ton, including every outlay, is about $9.25. These figures of yield and cost, per ton, are not strictly accurate, for in some of the mines the 2,000-lb. ton is used, and in others (because the directors fear that if the yield were reduced below 1 oz. per ton shareholders would get frightened and sell their shares!) the 2,240-lb. ton is in use.

The strong point about all these mines is that they continue to show good ore in their lowest workings. The Great Boulder is developed to 1,750 ft., the others vary from 900 to 1,200 ft., but in none of them as yet are there any noticeable signs of impoverishment.

Great Fingall is a purely quartz lode, of great regularity both in occurrence and value. All the others are lenticular in formation; but as the lenses make immediately one on the other, they may be described as, to all intents and purposes, continuous ore-bodies. The present appearance of all these mines is most reassuring; I feel less afraid to-day for their future in depth than at any previous time in their history.

Big as the production of gold from these leading mines now is, it is certain that if they are going to hold their values to great depths, to an average depth, say, of 2,000 ft., their high-water mark of production has not yet been reached. These mines can easily be developed at an average depth of 300 ft. a year. But they are only being exhausted at the rate of 150 ft. a year. The ore-reserves are, therefore, gaining rapidly all the time. If the gold is there, and can be quickly turned into bullion, it would be glaringly bad finance not to take it out as fast as possible. This more vigorous policy will no doubt be adopted by the big mines, and some of them are bound to expand. By April, 1904, the Great Fingall, now having its mill increased from 60 to 100 stamps, will be turning out 14,000 tons per month, for a yield of $350,000; its monthly profit of about $250,000 will be the largest of any gold mine in existence. Golden Horseshoe, in 1904, will reach a monthly output of $375,000, and Great Boulder is already in a condition to expand its present monthly yield of $250,000.

Altogether, this is a remarkable group of mines. But it only represents one phase of the West Australian position. After these best mines there are about a dozen at Kalgoorlie and elsewhere which have more or less hopeful prospects. Some of these are already large producers; but they have not that proportion of blocked-out ore-reserves relative to their market value which justifies the mine valuer in calling them really sound. If the ore exists, and vigorous development brings it into estimation, these mines may come to take rank with the best; but at present they fall short of that standard.

In several mines at Kalgoorlie, not as yet on a producing basis, bore-holes appear to have proved the existence in depth of lenses of rich ore. In one of these, good ore was lately cut in a bore at 1,950 ft. This is the deepest point yet reached in West Australia; it is a hopeful sign for the future of the country, and for that of Kalgoorlie and its big mines in particular.

But outside of all these; outside of Kalgoorlie altogether—in the almost trackless wastes of the great West Australian desert land—lie, at least I believe so, the makings of a great gold mining region. There is no country in the world where the capitalist has such good chances for getting hold of a payable mine at a reasonable outlay. There are, at the present time, probably five hundred localities in this great belt where gold is being worked. In nearly every case is this being done with inadequate capital, and with corresponding opportunity for those who have knowledge and money; as let the following example bear witness.

A few weeks ago some friends of mine secured an option on a mine, out in the desert, belonging to a small local company. This mine had been worked with 20 light stamps, and the small monthly profits—in the fatuous Australian way—were paid away in dividends as soon as earned. The mine had arrived at that stage where a fairly large expenditure was necessary, and, as it had no cash reserve, and its shareholders were poor men, they were alarmed at the outlook of affairs, and agreed to give my friends the option on the property. We inspected the mine just at that time, and a casual examination was enough to tell us that, if the sampling then being done bore out the statements of the owners, the mine was a most valuable one. Here was a free-milling-and-cyaniding ore-body proved for over 1,000 ft. in length, 18 ft. wide, and holding well in depth. What more could man desire? On the first level the ore had been stoped for 1,000 ft. in length; on the second level a stope was following the drift, which was then in ore some hundreds of feet; on the third level the ore had just been cut. Below this again, at about the horizon of the fifth level—the ore-body lying at a flat angle—a row of bore-holes had proved that it still carried its width and value. In other words, here was a mine with some hundreds of thousands of tons of ore practically exposed, and of an assumed good value, to be picked up for about $250,000. I have since heard that the sampling turned out satisfactory. The ore is low grade, showing a recovery value of $8 a ton, but it is easily treated and there are good working facilities. The prospective tonnage in the mine is large, and, as it will be worked on a basis of at least 10,000 tons per month, at an inclusive cost of $5 to $5.50, there seems little doubt but that it will turn out a valuable property. This is, of course, an exceptional case, even for West Australia, but it seems to me that any sound judge of a mine who will put in eight or

twelve months, examining the small prospect mines of the country, should find at least one which will justify his expenditure of time and money.

The standard of mine management in West Australia is high, at least at the bigger mines. As I have said before, it is as good as in the Transvaal—if not better; but an actual comparison between the two countries is not easily made. The ore in the Kalgoorlie mines, owing to the presence of tellurides, needs an expensive treatment, which is increased by the cost of fresh water at 5s. per 1,000 gal.; and the cost of working these mines cannot be compared with the cost at Johannesburg. But in the outside districts, on mines such as the Great Fingall, Sons of Gwalia, and Cosmopolitan, working and development costs do not exceed from $4.50 to $5.50 per 2,000-lb. ton; these mines, in every detail of working, compare favorably with the best work done on the Rand. This, let me state here, is not an argument in favor of the use of white labor in the Transvaal mines; for knowing the conditions as I do, I am in favor of the use of black labor there for years to come; but it is a tribute to the excellent work many of the mines in West Australia are now doing. To this satisfactory state of affairs, as is usual where metal mining is concerned, Americans are contributing not a little. A number of the best mines have passed, or are passing, into their control, and just at present the Mother Lode of California is a sort of stepping-off ground for West Australia. The American engineers now in the country are brainy and high-toned, and will give the English and Australian managers all they know to keep up with them. This is as it should be; for in the earlier days several of the mines fell into the hands of low-class American managers, who worked them for stock gambling purposes, and nearly ruined them.

There is a West Australian Chamber of Mines, or rather of mine managers, with headquarters at Kalgoorlie. This body, when it wakes to the fact that its deliberations are much more important to the future of the industry than are the meetings of a lot of half-efficient directors in London, and when it sets out to lead rather than follow, will do good work.

It is as yet hardly worth drawing attention to the output of copper, tin and coal in West Australia. These minerals exist, and are worked, but not on a scale of any importance. Gold is, and will remain for many years, the one great mineral asset.

ARSENIC FROM SMELTER FUMES.—Great expectations are entertained for the new arsenic refining plant nearing completion at the Washoe copper smelter at Anaconda, Mont. A high-grade, finely powdered arsenic, to be shipped in air-tight barrels containing 400 lb. each, will be made from the fine flue dust. After roasting in Brunton furnaces, the fumes emitted will be conveyed to the brick settling chambers alongside the smelter flue; and when subject to varying temperatures for purpose of crystallization the product will go to the reverberatory furnaces in the arsenic refinery. Subsequently the fumes pass through another set of chambers, used for the refined product only. Finally the arsenic is ground and prepared for market.

NATIVE COPPER IN GREENSTONE FROM THE PACIFIC SLOPE.

By H. W. TURNER.

The frequent association of copper ores with greenstones or metamorphic lavas and diorites suggests them as the original source of the copper. Pyrite is likewise an extremely common component of greenstone, and yet it is rare in unmetamorphosed lavas and diorites, from which the greenstones were formed. Kemp suggests that it would be interesting to test the basic minerals of such rocks for copper.

The well known amygdaloidal greenstones of Lake Superior are thought by some writers to have derived their native copper from overlying beds of diabase, yet Irving found these diabases mostly devoid of copper, except such as was plainly secondary.

In the foot-hills of Calaveras and Amador counties, California, are a series of chalcopyrite deposits in greenstone and amphibolite-schist, both originally andesite. While this chalcopyrite is plainly secondary, nevertheless the copper may have been an original constituent of the rock.

During the past year three distinct occurrences of native copper in greenstone from the Pacific slope have come to my notice.

One of these is from the property of the Pitt River Gold, Silver & Copper Mining Company in T. 34, N. R. 3, W. Mt. D. M., and about two miles south of Bully hill, in Shasta county, California. I am indebted to Mr. E. W. Nutter, of Redding, for samples of this interesting ore, which is a greenish metamorphic lava, speckled with minute irregular particles of native copper. Some of the rock contains as high as 5 per cent of copper. Nutter states that he found traces of copper over a superficial area 300 by 500 ft.; but no work has been done in depth to show whether or not the deposit goes down.

I am indebted to Mr. R. M. Brereton, of Oregon, for specimens of a second occurrence of native copper in greenstone. These came from a formation locally called amygdaloid, and supposed to be of Triassic age, near Medical Springs, about 25 miles N. E. of Baker City, Oregon. Mr. Brereton states that there is an extensive belt of this greenstone which is much broken and pointed and intruded by dikes of diorite-porphyry. No vein-system is apparent nor any definite walls. The native copper, together with chalcocite, chalcopyrite, cuprite and carbonate of copper, is said to favor the joints.

An examination of a thin section of the greenstone under the microscope shows it to contain soda-lime feldspars in a fine granular ground-mass, which is much obscured by secondary material. The rock has been much crushed, and nothing certainly original in it was detected except the feldspars. The section shows veinlets filled with lime carbonate. The native copper occurs in threads and grains, and presents all the appearance of being secondary; that is to say, it was deposited after the crushing and metamorphism of the rock, which appears to be a meta-andesite tuff.

A third sample of native copper in greenstone was seen which came from the laboratory of Thos. Price & Son, who received it from British Columbia.

Irving considers the native copper of the Lake Superior amygdaloid to be deposited from downward percolating carbonated waters, and therefore secondary. Pumpelly has shown that an intimate relation exists between the precipitation of copper and the peroxidation of the augitic constituents of the basic amygdaloid, and regards the ferrous oxide as the precipitating agent. Irving suggests that the ferrous oxide of the magnetite grains has also been concerned in the reaction since many particles of cementing copper have a core of magnetite. Kemp writes: "Presumably the reducing action produced by the oxidation of FeO to Fe_2O_3 in the production of chloritic 'green earth' (common in the amygdaloid) caused the reduction and the precipitation of the copper from some aqueous solution of sulphate, carbonate or silicate."

The above noted instances of the occurrence of native copper in greenstone are interesting as showing the widespread association of this metal with metamorphic volcanic materials. Probably future observations will show this association is a common one, and, possibly, that it results rather from the constituents of the greenstones being favorable agents for the precipitation of the copper, rather than that these rocks are necessarily the original source of the metal.

PROTECTION OF STEEL FROM CORROSION.*

By CHARLES L. NORTON.

Previous tests, carried out on perfectly clean steel, have been repeated on specimens in all degrees of initial corrosion, doubt having existed as to whether the results found with clean steel would apply to rusty or dirty steel. The specimens were imbedded in concrete mixed in the proportion of 1:2.5:5 to 1:3:6. The cements used were Alpha, Lehigh and Alsen. Care was taken in selecting the sand and stone, the latter being of such size as to pass a 1-in. mesh.

The results of the tests, which were carried out under various conditions, lead to the conclusion that structural steel, if encased in a sound sheet of good concrete, is safe from corrosion for a very long period; longer than the changes in our cities will allow any building to remain. It is necessary, however, to be sure that the steel is properly encased in the concrete, and, because of the difficulty in getting sound work, many engineers will not use concrete. This is especially true of cinder concrete, in which the porous nature of the cinder has led to much dry concrete, and many voids and much corrosion.

There can be no question that cinder concrete has rusted great quantities of steel, not because of its sulphur content, the danger from which is a myth, but because it was mixed too dry, through the action of the cinders in absorbing moisture, and therefore contained voids; and, moreover, because the cinder often contains oxide of iron, which, when not coated with the cement by thorough wet-mixing, causes rusting of steel which it touches. If cinder concrete be mixed wet and mixed well, it may be trusted as much as stone concrete, so far as corrosion is concerned.

The vadose circulation of underground water is that which is bounded above by the surface and below by the groundwater level. The vadose waters are distinctly oxidizing.

*Notes from Report Number IX of the Insurance Engineering Experiment Station, Boston, Mass.

THE HENRY COLLIERY.

By J. T. JENNINGS.

Immense tracts of coal lands are being developed in West Virginia, and to obtain the greatest output with most economy, plants equipped with the latest machinery are being constructed. The Davis Coal & Coke Company, with properties situated on the main line and branches of the West Virginia Central & Pittsburg railroad in the Allegheny mountains, controls about 100,000 acres of land underlaid with from two to five seams of bituminous coal, and now operates 18 mines. What promises to be the most extensive in modern development is the Henry colliery, situated in the heart of the property on the main line of the West Virginia Central & Pittsburg, at an elevation of 2,700 ft. above tide. It will develop the Upper Freeport and Lower Kittanning seams.

A number of bore holes, sunk at different points to ascertain the general conditions and to determine the best points for shafts, indicated the Freeport seam, averaging about 5.5 ft. thick, with a sand rock roof, and the Kittanning, averaging about 7 ft. thick, with an irregular slate binder in the center, and a slate roof. Both seams show a quality of furnace and coking coal that has gained a wide reputation from other mines of the company.

Two shafts designated as No. 1 and No. 2 were located conforming with surface conditions, in a syncline, so that all water might drain to them, and the mine grades should be in favor of the loads. No. 1 shaft, sunk eight months before No. 2, is 25 ft. by 13 ft. and 432 ft. deep, the bottom being 7 ft. below the Kittanning seam. The shaft has three compartments each 7 ft. by 12 ft.; two are hoisting-ways and the third an air way. This shaft was designed to take run-of-mine coal from both seams, and subsequently to handle all timber, machinery, etc., and hoist all stock and men.

The head-frame and tipple is constructed throughout of steel, without cover. The tipple, extending 100 ft. from the shaft, is equipped with a run-over dump to supply coal for the boiler plant, and a kick-back dump for railroad shipments. The coal from each seam can be loaded separately into railroad cars on two tracks by means of a "fly" in the kick-back dump that guides the coal into chutes and is controlled by the tipple men. The loaded cars are pushed off the cages by the empties, and descend a 2 per cent grade to the tipple dump, from which the empties descend a 2 per cent run-around to an automatic transfer, which carries them up an incline a vertical height of 6 ft., and places them in position to be pushed on the cage; there being a run-around on each side of the shaft, the transfer works both ways; it is driven by steam controlled by the headman. The transfer is supported on steel frame-work riveted to the head frame.

The engine room, south of the shaft, is a brick building 32 ft. by 21 ft. The engines are of the Vulcan Iron Works geared type; the winding drums are 7 ft. in diameter by 3 ft. wide. The crucible steel ropes are 1.25 in. in diameter. One of the drums is held by a geared clutch operated through a screw and wheel by the engineer. The ropes can thus be lengthened or shortened to hoist with both cages from either seam. Fans support the cage when cars are pushed on.

A larry delivers coal to the boilers over a steel trestle. The larry runs under the run-over dump, and the coal is dumped into the larry from the mine cars. The larry is operated by a 25-h. p. Westinghouse direct-current motor through an overhead trolley.

The main or No. 2 shaft is 450 ft. east of No. 1 shaft. From the surface to a depth of 218 ft. 6 ft. below the Freeport seam, the shaft is 36 ft. by 13 ft., divided into four hoisting compartments each 7 ft. by 10.5 ft., and one small compartment 3 ft. by 10.5 ft.; thence to 6 ft. below the Kittanning seam the shaft is 21 ft. by 13 ft., with two hoisting compartments and the small compartment, thus giving two independent hoisting compartments to each seam. The small compartment is used for air lines for drilling and mining machines, and for electric cables for haulage and pumping purposes. The shaft is cribbed with 10 by 10 in. hemlock placed skin to skin for a depth of 100 ft., and surrounded by concrete 2.5 ft. thick down to the solid rock. The 10 by 10 in. buntons are mortised into upright stringers, 10 by 10 in., which in turn are imbedded in the side cribbing. The head-frame is entirely of steel, is under cover and is 102 ft. high. The main

HEAD-FRAME, HENRY SHAFT, NO. 1.

floor of the tipple is 35 ft., the dump is 65 ft., and the center of the sheaves 85.4 ft. from the coping. The sheaves are 10 ft. in diameter mounted on 21 in. by 5 in. I beams thoroughly braced. Each set of wheels is mounted parallel with the shaft, the forward wheel 8 ft. ahead with a difference in centers of 9 in.

The buildings containing the hoisting engines are of brick 35 ft. by 25 ft., the roofs being supported on steel trusses. They are situated on either end of the shaft and 75 ft. from it. The engines are of Vulcan Iron Works make; two sets of 24 by 36 in. duplex direct-acting, equipped with steam emergency brake, steam reversing motion, steam throttle, and a hand-brake for safety. The winding drums are 7 ft. in diameter and 8 ft. long, the ropes are 1.25 in. crucible steel.

The engines are supplied with steam by 7-in. steam lines branching from a 10-in. steam header. Each of the engine branches has a 7-in. Austin separator with a 4-in. Wright emergency steam trap draining it. Pneumatic signal systems are used in the shafts because of their simplicity and reliability.

The self-dumping steel cages were built by the Vulcan Iron Works. The sheet steel receiving chute extends enough over the shaft so that the cages overlap it when dumping, thus preventing coal from falling down the shaft. In the shaft 8 in. by 6 in. yellow pine guides are used, notched with the buntons and secured with rag bolts. On the head-frame the guides are bolted in steel channels riveted to the frame work.

At the bottom of this shaft a sump about 6 ft. deep receives the water from the rings in the shaft; this water drains to the larger sump at No. 1 shaft. East of the shaft two main headings were driven 40 ft. wide by 12 ft. high; for 300 ft. they are made 30 ft. wide and 10 ft. high by closely timbering with 24 by 24-in. collars. In each heading is a double track to be used for receiving loaded cars from the electric locomotives. The normal size of the mine headings is 13 ft. wide and 7 ft. high. West of the shaft one heading was driven 40 ft. wide and 12 ft. high for 100 ft., and is laid with a double track; at 100 ft. side headings 13 ft. wide branch off and intersect the main headings on the east side. These headings receive the empty cars from the shaft, each being long enough to hold about 50 cars. This arrangement avoids delays to the mine locomotives in making up trips.

The coal is caged from one side, the loaded cars pushing the empties off. The grade of the loaded tracks near the shaft is 2 per cent and of the empty car tracks 2.5 per cent. The main headings are driven enough up the pitch to give a 2 per cent grade in favor of the loads. Air courses run parallel to the headings, with a barrier pillar of 100 ft., the mine being opened up on the double entry, and room and pillar system. The face headings are turned at right angles to the main headings. and the butt headings at right angles to the face headings, having a barrier pillar of 50 ft. The rooms turned off the butt headings are 50 ft. center to center and 250 ft. long.

The main and face headings in both seams are being driven on the same courses, thus keeping developments alike. Both shafts make considerable water above the Freeport seam, although there is very little water encountered in the working places. In the Freeport seam at No. 1 shaft provision is made to take care of all the water from both shafts by a pump room and sump cut out of the solid coal and the overhead rock. The water from No. 2 shaft and the workings of the Freeport seam drain to this sump. In the Kittanning seam the water that accumulates in the shafts and working places drains to a local sump at the foot of No. 1 shaft, from which it is pumped by a 16 by 9 by 18 in. Smith-Vaile pump to the large sump in the Freeport seam. In the large pump room are two 24 by 12 by 30 in. single stroke Yough steam pumps having 12-in. suction and 10-in. discharge, delivering 800 gal. per minute to the surface. One pump suffices at present, the second being in reserve.

For ventilating both shafts there is at No. 1 air shaft a Capell fan 13 ft. 2 in. by 7 ft., driven by a direct-connected 19 by 16-in. engine, capable of delivering 200,000 ft. of air per minute with a water gauge of 4.2 in. when making 200 revolutions per minute. The fan housing and engine room are 50 ft. from the shaft and are of brick with a sheet iron cover. There is a closed arch over the airshaft. In the shafts the partition between the hoisting and the air way is made air tight with 2-in. tongue and grooved lumber. Underground, overcasts are used to eliminate doors. The fan is so arranged that it can force or exhaust air, the change being quickly made. It now forces air.

Good haulage roads were considered important, and all main and face headings were laid with 60-lb. steel rails, spliced with angle bars and well surfaced and ballasted. Hence a high speed can be maintained, and the possibility of delays from wrecks is minimized.

Electric haulage is being installed in the Freeport seam, the standard electric locomotive adopted weighing 13 tons and having a drawbar pull of 4,500 lb. Current is taken by overhead trolley from 0000 grooved trolley wire, the insulated suspensions being secured to the roof by brackets. The return circuit is through the rails which are bonded with 00 "all-wire protected bonds" secured under the angle plates, thus protecting them from damage by derailed cars.

As there has been considerable trouble in supporting heavy lead cables in shafts and bore holes, from the cable being too weak to support its own weight for a long time, the writer, in inaccessible places like bore holes, uses a ¾-in. rope to support the cable. The cable is secured by clamps at stated intervals, the distance between the clamps being governed by the weight and length of the cable. The wire rope is suspended from an insulated turnbuckle, and centered at both ends of the hole. Insulators at both ends prevent the cable from becoming grounded should the lead shield be punctured. The cable and rope are put down at the same time, the clamps and rope receiving a thorough coat of rope paint, which protects them from rust. The cable, clamps and rope readily pass through a pipe twice the diameter of the rope. At this shaft a 2-in. cable was readily supported in a 4-in. pipe. Where feeder wires cross the headings insulated wires are used, protected by a wooden cover. The return wire is insulated, and carried up the shaft in a pipe.

The coal is undercut by Ingersoll-Sergeant puncher machines, there now being 10 of these.

All buildings about the shafts are of steel or brick. The tipple of No. 2 shaft is of steel, joined to the head frame, with sides and roof of corrugated iron. It was designed to handle an output of 3,000 tons daily without crowding. As there are two seams of coal of different qualities, to allow the coal from each seam to be loaded into railroad cars separately, the tipple is equipped with two sets of screens and two picking tables.

The coal from each seam is automatically dumped from the 2-ton mine cars at a height of 30 ft. from the ground floor of the tipple into a receiving chute. Thence it passes over a screen 6 ft. wide by 10 ft. long, which removes all slack. The chute and screen have an inclination of 32 degrees. The coal which passes over the screen is delivered to the picking tables, which are 30 ft. long, 4 ft. 10 in. wide and 8 in. deep. Rock and bony coal are picked out by boys. The coal is delivered to the railroad cars through a cast-iron chute, the inclination of which is adjusted by weights to meet the loaders' requirements. By passing the coal down the cast-iron chute much breakage is eliminated, and by means of a continuous sectional chute, railroad cars are loaded without adjustment during loading. The slack coal which passes through the screens goes to a large bin, whence it can be loaded into box cars for shipment, or taken by larries to the coke ovens. To load run-of-mine from this tipple the screens are equipped with hinged doors supported by weights. These doors close over the screens, making a continuous sheet iron chute from the dump to the tables. Any rock hoisted is diverted by a 'fly' inserted in each of the receiving chutes.

The receiving chute and screen are supported on heavy knuckles, and by means of a screw and wheel the inclination is adjusted to meet the running conditions of the coal. On either side of the picking tables are boxes to receive the slate and bony coal picked out by the slate pickers. On the floor below two 18-in. conveyor belts, at a speed of 60 ft. per minute, run under the rows of boxes, taking the slate to bins, from which it can be loaded into railroad cars or taken to the rock dump. The picking tables are of the sectional, flat, horizontal, revolving type, mounted on rollers and running at a speed of 60 ft. per minute. The picking tables and conveyor belts are driven by gearing and belt from a 30-h. p. Westinghouse induction motor. One table can be operated independently of the other.

The yard for this tipple has seven tracks, five of which run underneath the tipple, the two tracks on the outer end of the tipple being for shifting. The following sizes of coal are prepared for market: Freeport run-of-mine, lump and slack; Kittanning run-of-mine, lump and slack. The head frames and tipples were built by Heyl & Patterson, of Pittsburg, Pa.

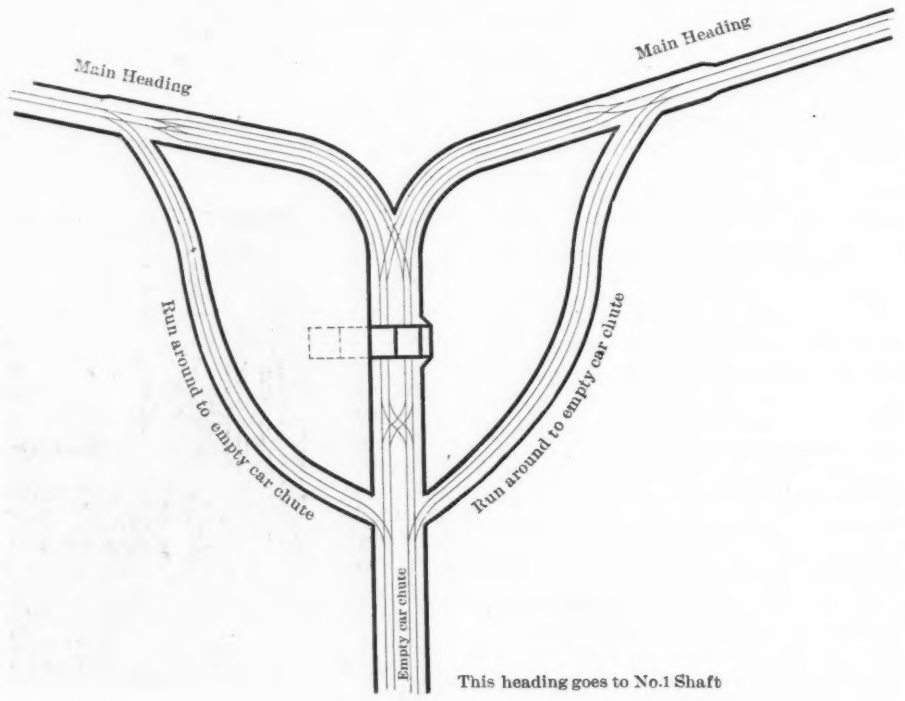
Considerable attention was given to the design of the power plant. An electrical system for haulage, pumping, lighting and stationary motor work was adopted, which, from its economy and flexibility, embodies many interesting features. At present there are in use a 500-volt direct-current, and a 600-volt 3-phase alternating current. The direct-current will be used exclusively for the larries and mine locomotives, until the loss from the length of line interferes by compelling a prohibitive investment in copper for feeder lines.

The 3-phase alternating current is used for all stationary motors in coal bins, tipples, shops, mine pumps, and for lighting. It will also eventually be used for haulage by being stepped up at the power-house by transformers, transmitted at high voltage to a point centrally located, there stepped down and then converted to direct-current by a rotary convertor.

It seems to be the practice where this system is adopted at mines to carry the high voltage lines through the underground workings in a three-wire lead-covered cable. To maintain the insulation of a 6,000 to 10,000-volt cable down a shaft and through workings necessitates constant attention; in air courses the cable is exposed to the constant danger of the shield being punctured by rock falls, and the average mine atmosphere is not favorable to the operation of a rotary convertor.

The writer, therefore, advocates sinking a bore-hole, centrally located with respect to the inside workings, large enough for a cable. On the surface at the bore hole should be a substation to contain the transformers and rotary convertor, the high voltage current being brought to it on a pole circuit. The low voltage direct-current from the convertor can be taken down the bore hole, and distributed at the working voltage of the lines. Such a system has the advantage of economy over direct current, in that low voltage can be changed to a high voltage and back with much less copper in transmission lines for the same line loss, the cost of copper lines varying inversely as the square of the voltage.

Experience has proven that 500-volt direct-current motors are not a success when used on mine pumps, and in coal bins, as dampness and dust materially increase commutator and insulation troubles, and cause a frequently interrupted service from short circuits when used in connection with motor haulage lines. On the other hand, the alternating-current induction motor is admirably adapted for this work; its windings are embedded in the slots of the stationary part or frame and encased from injury; the armature, of the squirrel cage type, is absolutely sparkless, thus giving the advantages of good regulation, simple con-


Main Heading
Main Heading
Run around to empty car chute
Run around to empty car chute
Empty car chute
This heading goes to No.1 Shaft

HEADINGS AT FOOT OF HENRY NO. 2 SHAFT.

struction and minimum attention. This type of motor has given the utmost satisfaction for mine service, the Davis Company using at its other collieries 25 three-phase induction motors ranging from 5 to 50 h. p. in size.

The power-house is a brick building 90 ft. long, 48 ft. wide and 15 ft. high. At present there are installed a 24 by 26¼-in. Ingersoll-Sergeant single-stage compressor, capable of delivering 1,624 cu. ft. of free air per minute when running at 90 revolutions per minute; a 150-kw. 3-phase Westinghouse alternator belted to an 18 by 24 in. Russell 4-valve engine running at 150 revolutions; and a 250-kw. Bullock direct-current generator direct connected to a 25 by 18 in. Ball-Wood engine running at 200 revolutions per minute. The marble switch-board, built by the Wagner Electric Company, has seven panels—three direct-current feeder panels, a direct-connected generator panel, a 3-phase current feeder panel controlling three circuits, and a 3-phase generator panel. Lead-covered cables, beneath the floor, lead from the generators to the switch-board. The feeder circuits are carried in porcelain insulators up the end wall of the building to a distributing tower.

There is sufficient space reserved in the buildings to duplicate the present units, and to allow an extension for additional units the end is temporarily closed with corrugated iron. Near the power-house is the boiler house, a brick building 70 ft. long by 40 ft. wide, having one end temporarily closed sion. There are now installed six 150-h. p. Phoenix Iron Works tubular boilers in three with corrugated iron to permit future extenbatteries, but two more boilers are ordered, and their foundations are in. All the boilers lead into a 14-in. main steam header, which, inside the power-house, is connected to a 14-in. Austin separator drained by a No. 6 Wright emergency steam trap. The 14-in. header extends through the opposite end of the boiler house supplying steam to the hoisting engines at No. 1 and No. 2 engine, and to the fan and pumps. Most of the outside piping is underground and thoroughly protected. Ample provision is made for condensation by using traps.

The power-house engines exhaust through a main 16-in. exhaust header into a 2,000 h. p. Stilwell heater of the open type. The piping is arranged that the exhaust may be turned into the heater or the atmosphere at will. The boilers are fed by a 10 by 10 by 12-in. Smith-Vaile plunger hot water pump, the water entering the boilers at 260° F. A space of 9 ft. is between the boilers and a coal pocket, 12 ft. wide by 12 ft. high, which extends the full length of the boiler house. The larry discharges the coal by an extended chute through openings in the side walls directly in front of each battery of boilers and 15 ft. from the ground floor. The coal pocket has storage capacity for 48 hours running.

The water supply for the boilers is obtained from a mountain stream 1,200 ft. distant. A timber dam forms a reservoir for times of low water. The water flows to the boiler house by gravity through 5-in. iron line, and the supply pump in the boiler house pumps the water to a 30,000-gal. tank 100 ft. higher on the hill side.

The shops, centrally situated with reference to the two shafts and the power plant, are in a brick building 140 ft. long by 50 ft. wide, divided into five parts by fire-proof walls. The first section, 30 ft. by 50 ft., is a carpenter shop; next comes the blacksmith shop, 36 ft. by 50 ft., where all iron and smith supplies are stored, with room for four fires; the machine shop, 36 ft. by 50 ft., is to be equipped with lathes, drill press, pipe threading machines from 2½ to 12 in. and other tools. Adjoining this is a supply room containing mechanical and electrical supplies; also offices. A large arched door in each of the five walls permits the transmission of repairs from one shop to the other.

Construction and development work are being rushed to bring this plant up to its rated daily output of 4,000 tons. At present no coke ovens are under construction, although an extensive coke plant is contemplated. The town site of Henry is on the side hill half a mile from the plant. Sanitary conditions are good, water being obtained from deep wells. Electricity is used for lighting, and the town promises to have a rapid growth.

The plans for this plant were prepared and carried out under the personal supervision of Mr. J. H. Healy, now general superintendent of the Davis Coal & Coke Company, Mr. J. G. Boyd being the resident superintendent.

PIG IRON PRODUCTION IN CANADA.

The American Iron & Steel Association has received direct from the manufacturers the statistics of the production of all kinds of pig iron in Canada in the calendar year 1903. They show a decrease of 54,139 gross tons, or nearly 17 per cent, as compared with 1902, but an increase of 20,442 tons as compared with 1901.

The total production in 1903 amounted to 265,418 gross tons, against 319,557 tons in 1902. In the first half of 1903 the production was 132,930 tons and in the second half it was 132,488 tons, a falling off of only 442 tons. Of the total production in 1903, 247,905 tons were made with coke and 17,513 tons with charcoal. Nearly one-half of the total production was basic pig iron, namely, 126,892 tons. Less than 1,000 tons of bessemer iron were made. Spiegeleisen and ferromanganese have not been made since 1899.

The following table gives the total production of all kinds of pig iron (including spiegeleisen and ferromanganese) in Canada from 1894 to 1903. Prior to 1894 the statistics of pig iron production in Canada were not collected by the Association.

Year.	Tons.	Year.	Tons.
1894	44,791	1899	94,077
1895	37,829	1900	86,090
1896	60,030	1901	244,976
1897	53,796	1902	319,557
1898	68,755	1903	265,418

The unsold stocks of pig iron in Canada on December 31 amounted to 19,168 tons.

On December 31, 1903, Canada had 15 completed blast-furnaces, of which 9 were in blast and 6 were idle. Of this total, 11 were equipped to use coke for fuel and 4 to use charcoal. In addition, 3 coke furnaces and 1 charcoal furnace were being built or were partly erected on December 31, but work on at least two of the furnaces had been suspended some time ago.

The Dominion Iron & Steel Company, of Sydney, N. S., had all four of its furnaces running during 1903, although two only were in operation on December 31. No date has been set for the blowing in of the idle furnaces.

The Londonderry Iron & Mining Company, of Londonderry, N. S., did not operate either of its furnaces in 1903. During the year it rebuilt furnace A and expected to have it in blast about the middle of January. This stack is now 75 by 17 ft., and has an annual capacity of about 45,000 gross tons of foundry pig iron. The company is uncertain whether it will rebuild furnace B, which has been long idle.

The Nova Scotia Steel & Coal Company operated Ferrona furnace, at Ferrona, N. S., for 48 weeks in 1903 and was running it on December 31. The new furnace which the company is erecting at Sydney mines, in Cape Breton county, will probably be completed in June, 1904. It will have a daily capacity of 200 tons.

The Canada Iron Furnace Company was relining its furnace at Radnor Forges, Quebec, on December 31, but expected to have it ready for blast about the middle of January. The furnace ran for 41 weeks last year. The Midland furnace of the company, at Midland, Ont., ran for 45 weeks last year and was active on December 31.

John McDougall & Co. had one of their two furnaces at Drummondville, Que., in blast on December 31. The idle furnace may resume work during the coming summer.

The Algoma Steel Company, Limited, of Sault Ste. Marie, Ont., had two furnaces completed and ready for blast on December 31. The date when they may be blown in is uncertain.

The Deseronto Iron Company, of Deseronto, Ont., operated its charcoal furnace for 46 weeks in 1903, and was running it on December 31.

The Hamilton Steel & Iron Company, Limited, of Hamilton, Ont., was operating its furnace on December 31. It ran for 43½ weeks last year.

COAL CONSUMED BY THE SIBERIAN RAILROAD.—About 300,000 tons of coal are consumed yearly by the Siberian Railroad. The bulk of the coal comes from the mines in the Tomsk and Irkutsk districts of Siberia, but the Urals supply most of that consumed on the western section of the line.

AMERICAN DYNAMITE INDUSTRY.—The centralization by consolidation of the explosive industry makes interesting the profits accruing to individual dynamite manufacturers. Thus the Giant Powder Company, Consolidated, of California, supplying an important part of the western consumption of explosives, produced in 1903 fully 700,000 lb. more dynamite than in any preceding year, paid 12 monthly dividends of 50c. each ($120,000 in all), and reduced its indebtedness by $43.530 in all.

GOVERNMENT ACID PLANT.—An appropriation of $55,000 is asked for by the United States Navy Department for the erection and equipment of a sulphuric acid plant at Indian Head, on the Potomac river. It is contended that as the government already manufactures its own smokeless powder, and used last year 3,000,000 lb. mixed acid, valued at 3.5@4c. per lb., and 1,600,000 lb. sulphuric acid, worth 1@1.25c. per lb., delivered, it can save about $12 per ton by making the acid. Independent acid manufacturers are opposing this action, as did the smokeless powder people previously, claiming that it will cost more than if the government purchased its supplies from private producers.

MINING IN SOUTHEASTERN MISSOURI.

The St. Joseph Lead Company, in the operation of its mines at Bonne Terre, does not permit the cages employed for hoisting purposes to be used for access to the mine. Men going to and from their work must climb the ladders. This rule does not obtain in the other mines of the district. The St. Joseph Lead Company employs electric haulage for the transport of ore underground at Bonne Terre. In the other mines of the district, mules are generally used. The flow of water in the mines of the district is extremely variable; some have very little; others have a good deal. The Central mine is one of the wettest in the entire district, making about 2,000 gal. of water per minute. Coal in southeastern Missouri costs $2 to $2.25 per ton delivered at the mines, and the cost of raising 2,000 gal. of water per minute from a depth of something like 350 ft. is a very considerable item in the cost of mining and milling, which, in the aggregate, is expected to come not much over $1.25 per ton.

The ore shoots in the district are unusually large. Their precise trend has not been identified. Some consider the predominance of trend to be northeast; others, northwest. They go both ways, and appear to make the greatest depositions of ore at their intersections. However, the net-work of shoots, if that be the actual occurrence, is laid out on a very grand scale. Vertically there is also a difference. Some shafts penetrate only one stratum of ore; others, two or three. The ore-body may be only a few feet in thickness; it may be 100 ft. or more. The occurrence of several overlying ore-bodies obviously indicates the mineralization of different strata of limestone, while in the very thick ore-bodies the whole zone has apparently been mineralized.

The grade of the ore is extremely variable. It may be only 1 or 2 per cent mineral, or it may be 15 per cent or more. However, the average yield for the district, in large mines which mill 500 to 1,200 tons of ore per day, is probably about 5 per cent of mineral, assaying 65 per cent Pb, which would correspond to a yield of 3.25 per cent metallic lead in the form of concentrates. The actual recovery in the dressing works is probably about 75 per cent, which would indicate a tenure of about 4.33 per cent lead in the crude ore.

A NEW COAL-FIELD IN HUNGARY.—It is reported that coal seams of promising character have been found recently in Transylvania. (*Montan-Industrie und Handelszeitung*, January 15, 1904.) The size and character of the deposits have been tested by the drill, and active operations are to begin in the near future. The field is situated between the towns of Brad and Nagyhalmagy.

IMPORTS OF CEYLON GRAPHITE.—Imports of plumbago, or graphite, into the United States from Ceylon for the year 1903 were 44,013 barrels. Of this graphite, 17,376 barrels were lump, 8,452 chip, 13,483 dust, and 4,702 barrels were not classified. The principal importers were Robert Crooks & Co., 16,110 barrels; Patterson, Boardman & Co., 9,062; McCullough-Dalzell Crucible Company, 5,606; H. J. Baker & Co., 5,235; H. W. Peabody & Co., 3,681; Pettinos Bros., 3,078 barrels.

PLATINUM IN BRITISH COLUMBIA.*

By R. W. Brock.

In the 'Summary Report' of the Geological Survey of Canada for 1901,[1] prospectors and mining men were advised to be on the lookout for platinum in the West Kootenay and Boundary creek districts of British Columbia. It had long been known to occur in the placers of the Tulameen and other branches of the Similkameen river, some distance to the west of Boundary creek, and it seemed probable that its occurrence would not be confined to one locality. The special reasons for suspecting the occurrence of platinum in West Koontenay and the Boundary creek districts were: First, the general resemblance in many essential particulars between the rocks and ores of these districts and those of the Similkameen; second, the presence of masses of basic eruptive rocks, now frequently altered to serpentines—rocks in which platinum has been most frequently found 'in place,' and which seemed to be the chief source of the platinum of the Similkameen; third, the fact that the chalcopyrite-pyrrhotite ore-bodies of these districts, sometimes slightly nickeliferous, bear a marked resemblance to the platinum-bearing copper-nickel deposits of Sudbury, Ontario. The subsequent discovery of platinum in the copper ore of the Rambler mine, Wyoming, noted in this JOURNAL, in the same form (sperrylite) as in the Sudbury copper ores, further emphasized this possibility.

In the summer of 1902, Mr. Henry Jackson, manager of the Contact mines, at Burnt Basin, had samples of ore from this property tested for platinum, with positive results. The same summer the property was examined by the writer, in order to confirm the discovery and to secure information regarding the nature and mode of occurrence of the ore. The principal claims belonging to the Contact Consolidated Gold Mining Company are the Contact and Mother Lode, situated in Burnt Basin, three miles west of Coryell, Grand Forks mining division, Yale district, B. C. These lie in a district of considerable geological complexity, which has been the scene of numerous igneous intrusions extending from probably Paleozoic to Tertiary times, and during that period it has been subjected more than once to the throes of mountain-building. Consequently, the older rocks are much disturbed, sheared, fractured and altered The oldest rocks are limestones, argillites and greenstones, the latter having the greatest areal distribution. A large part of the district is, however, composed of later igneous rocks.

The limestones in places are sufficiently pure for use as smelter flux, but are sometimes dolomitic. When comparatively unaltered, they are dark and carbonaceous, but they are usually marmorized to a white marble. The argillites are often altered to schists and hornfels. These rocks have been invaded by the greenstone, probably an augite porphyrite, though now sheared and altered. The above rocks are cut by a coarse gray granodiorite, which sends dikes and apophyses into the older rocks. The greenstone of the Mother Lode is also cut by a basic gabbroidal rock, which bears some resemblance to the more basic monzonites. To the north of the property is a still more recent hornblendic granite, with accompanying acidic and basic (vogesite) dikes. To the east is a large area of syenite, of pulaskite (alkali-syenite) and monzonite habits. This rock is of Tertiary age. Some dikes of it carry free gold as a primary constituent plainly visible to the naked eye. Numerous dikes of syenite-porphyry, some of them no doubt from this alkali-syenite, cut all the older rocks.

The veins occur in the disturbed areas, where the porphyry dikes are most numerous. The veins on the Contact property are chiefly auriferous quartz-veins, but a short distance to the south there exist argentiferous veins, zinc-blende and galena.

So far, only prospecting work has been done on the property; this is confined, for the most part, to two quartz-veins on the Mother Lode claim. These lie about 20 ft. apart, with a strike N. 70° W. (Mag.). On the lower vein, which is about 2 ft. wide, an incline shaft was sunk at an angle of 45° to a depth of 65 ft. At 25 ft. the vein is lost, through faulting or a sudden increase in dip. From the bottom of the shaft a cross-cut 65 ft. long, running N.E., encounters what is supposed to be the upper vein, here 6 ft. wide. Drifts have been run on this vein from the end of the cross-cut.

The veins lie in greenstone, between two large porphyry dikes. The quartz, which is somewhat milky, has small amounts of metallic sulphides scattered through it. Pyrite, galena and blende are the commonest, but chalcopyrite and some molybdenite also occur. On the surface the sulphides have been leached out, leaving free gold and some copper carbonates in the rusty and porous quartz. A little native copper is also reported to have been found at the surface. The principal value is in gold, but a little silver is also present. In one of the neighboring porphyry dikes a little molybdenite was detected, and the dikes are reported to assay about $3 in gold.

There appears to be a genetic relationship between these dikes and the ore-bodies in this part of British Columbia.[2]

Qualitative tests of samples of the ordinary sulphide-bearing quartz from different points in the veins having proved the presence of platinum, four samples were given to Mr. Donald Locke, of the Geological Survey assay-laboratory, and he obtained the following results:

No. 1. (Mother Lode upper vein, lowest level)—0.1 oz. platinum per ton.

No. 2. (Dump from Mother Lode, upper vein)—0.05 oz. platinum per ton.

No. 3. (Intersection of cross-cut from shaft and upper vein)—0.06 oz. platinum per ton.

No. 4. (Outcrop of lower vein)—none.

Private assays made by competent and reliable firms have yielded results varying from nothing to as high as 0.25 oz. per ton.

It is evident that the platinum is unevenly distributed through the vein, in which respect it is similar to the gold and sulphide. But in places it may be present in commercial quantities.

In what form the platinum occurs has not yet been determined. It is probably held by the sulphides, as is the gold. If it is associated with the copper in this vein, this fact would account for its irregular distribution,

*Published by permission of the Acting Director of the Geological Survey of Canada.

[1]Page 67.

[2]'West Kootenay Ore-bodies,' *Journal* of the Canadian Mining Institute, 1899, p. 83.

because the chalcopyrite content varies greatly from point to point.

The occurrence of platinum in gold-quartz is somewhat unusual. Such an occurrence is mentioned by Phillips in the Beresovsk mines, Russia.[3] Boussingault[4] obtained platinum by panning the outcrop of a gold-quartz vein in the province of Antioquia, Colombia. It is also stated to occur in quartz-veins of Brazil,[5] while Kemp states that with the co-operation of Dr. D. T. Day and Mr. A. W. Johnson, he has detected it in quartz-veins in several American localities.[6] Possibly the reason it has not been reported from a larger number of quartz-veins is that, unless specially searched for, it is almost certain to be overlooked. Its occurrence with gold in placers is widespread.

Platinum, then, has been found to occur under the following conditions in British Columbia:

1. In the placers of the Similkameen.
2. In peridotite and serpentines and in an associated granite in the same district.[7]
3. In gold-bearing quartz-veins.

Since there exist family resemblances between the rocks and ores of several districts of southern British Columbia, and a platinum content may be one of these family traits, it should be looked for in other localities than those in which it has already been found. It is not impossible that some of the copper ores contain this metal.

Basic igneous rocks, such as those in which platinum so often finds a home, are not confined to southern British Columbia, but are found as far north as the Atlin district, so that platinum possibilities are not restricted to the southern part of the province. Prospectors might also be reminded of the fact that such basic rocks sometimes carry nickel and chrome.

THE GOLD MINE OF FALUN, SWEDEN.— The Falun mine was first exploited for its copper, but the ore became poor in depth, and attention is now chiefly directed to the extraction of gold, which occurs both native and in sulphides. In the last 20 years 1,560 kg. of fine gold have been produced.

THE EDISON NICKEL-IRON BATTERY.—The negative element of the Edison battery is composed of iron and iron protoxide, obtained by passing a current of hydrogen over pulverized sesquioxide of iron at a high temperature. The reduced iron is then slowly cooled in a current of hydrogen and washed in water; the treatment depriving it of the property of oxidizing when exposed to the air. As the mixture of protoxide and metal is a poor conductor, its conductivity must be increased by the addition of other materials. This is accomplished by treating it with ammoniated copper and mercury oxide until a mixture is finally obtained having 64 per cent iron, 30 per cent copper and 6 per cent mercury.

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[3] 'Ore-Deposits,' second edition, p. 545.

[4] *Annals Chimiques et Physiques*, vol. XXXII, 1826, p. 204.

[5] 'Geology and Physical Geography of Brazil'; Hartt, p. 448.

[6] 'Bulletin 193,' United States Geological Survey, p. 31.

[7] 'Bulletin 193,' United States Geological Survey, p. 38, *et seq.*

THE KAFFIR MINE-WORKERS.

By T. LANE CARTER.

Whether an old man of 65 or a youngster of 15, the Kaffir on the Rand is invariably called a "boy" by the white inhabitants. A miner always asks how many "boys" are at work in a stope; never how many Kaffirs. These boys have played an important part in the industrial development of the Rand. Next to the successful introduction of the cyanide process (without which very few mines would ever have amounted to much), black labor has been the most important factor in making the Johannesburg of to-day. The mines could not be worked at a profit were the average wage as high as it is on most gold-fields; true, the skilled white man receives a higher wage than in other parts of the world, but the small pay given to the large bulk of black labor makes the average a low one.

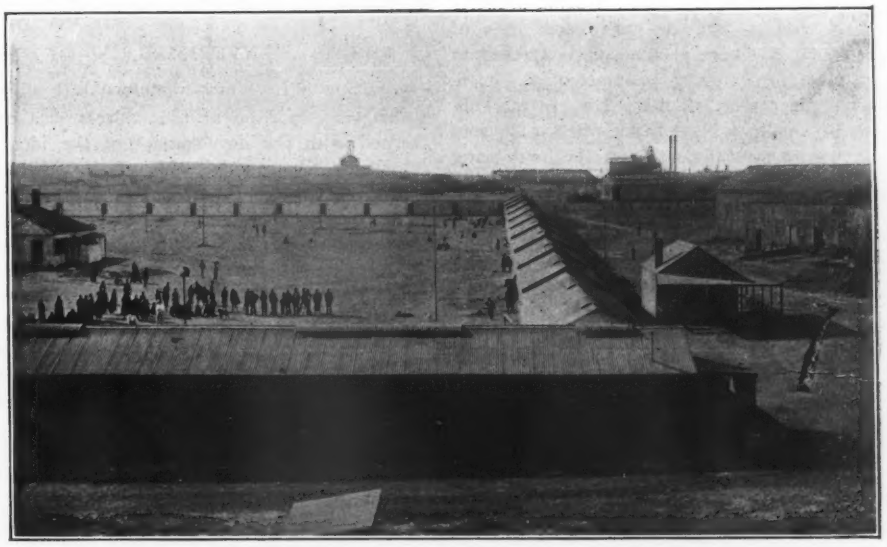
There is a marked improvement in the efficiency of Kaffir labor, compared with pre-war days, due not so much to a change in the Kaffir, but to better management by the bosses. Before the war, the illicit liquor traffic played havoc among the boys; on Monday mornings the writer has seen 30 per cent of them incapacitated through their Sunday orgies. There is a wonderful improvement in this respect; at present one of the most stringent laws in the land is that prohibiting the sale of intoxicating liquors to Kaffirs; the offenders cannot buy themselves off, as formerly, but are imprisoned for a very long term. On the whole, therefore, the native miners get no intoxicating liquors at present.

The introduction of the piece-work system, while it makes for efficiency, has met with little success, as the Kaffir does not take to it. More success could be attained were a system instituted of paying on the spot, in cash, for all extra work as soon as done. Boys cannot understand why they should wait so long for the money.

Another reason for the increased efficiency is the extra care taken of the boys. Formerly, on some mines, boys went into the mine at 7 a. m., and were expected to work until 5:30 p. m. without food, whereas now an ample ration of porridge is sent below for each boy at the dinner hour.

The housing of the Kaffirs requires no improvement. They live in a large quadrangular structure, called a compound, a view of part of which is shown in the accompanying photograph. Some of the compounds are large enough to house 3,000 boys. They are usually built of stone; sometimes of corrugated iron. The boys sleep in bunks, one on top of the other, 15 boys being in one room when the compound is full. Roof ventilators are used; coal and wood fires are used on cold nights; a large tank with flowing water is placed in the center of the compound, where the boys can wash themselves; sometimes the rooms are lit by electric lights, more usually, candles. The boys do not believe in fresh air, and are liable to stuff up all the ventilating holes, on cold nights, in order to keep warm.

There is a superintendent in charge of each compound. It is an important position, requiring a thorough grasp of the Kaffir character, and a knowledge of the numerous languages. Naturally, the white man who has been brought up in close contact with blacks in South Africa makes the best compound-manager. There is a staff of native police under this manager, who keep order, and report any signs of an impending inter-tribal fight in the compound. Most natives strive to attain the rank of policemen.



KAFFIR COMPOUND ON THE WITWATERSRAND.

Of the native mine-workers, the Zulu boys are the best. There were quite a number here in 1896, but as the pay on the Rand is only a little higher than in Natal, they have practically deserted the gold-fields. The Zulus hold most of the other natives in contempt, and if they get "on the war-path" they kill off a few of the weaker boys.

The Basutos are nearly equal to the Zulus, and make good workers when willing to do so. They are the most independent natives in South Africa, and therefore rather difficult to manage. Their country, Basutoland, is a place where the white man has no say, and they seem to always remember the fact.

The natives from the east coast of Africa are the Rand's mainstay. In intelligence they are behind the Zulus or Basutos, but they are more reliable.

As before intimated, more attention is now given to the food-supply of the boys. After much debate on the subject, it has been decided to give them Kaffir beer, a mild beverage.

Every day each boy receives a stamped ticket for beer, and he must use the ticket on day of issue; in this way they are prevented from accumulating a big stock.

The following gives an idea of the rations a boy receives each day: One pint Kaffir beer; 1 pint coffee, well sweetened; 2 lb. corn-meal, made into porridge; ¼ lb. meat and ¼ lb. vegetables, made into a soup. On Sundays, beans are given instead of corn-meal porridge. The natives from Quillimane (east coast) will not eat corn-meal, and are therefore supplied with rice.

Each boy takes his own vessel to the cook-house at meal hours, where his portion is doled out. The food is eaten in their rooms. Those working on the surface have the dinner hour off. The mine boys remain below all day. There are different cooks for the various tribes.

Sanitary arrangements are carefully looked after. Latrines are placed well away from the compounds; a concrete drain from both, through which water always flows, is used as a urinal. The compound-manager and sanitary inspector examine sanitary arrangements daily. Izal disinfectant is freely used. To meet the sanitary requirements underground, buckets are used, and are brought up daily. The inspector of native affairs visits the compound weekly, to see that the boys are being properly looked after. They are well taken care of when sick, as there is a hospital attached to each mine, in charge of a competent physician. Pneumonia carries off many boys in the cold months; smallpox plays havoc when it appears, but is most carefully watched, the boys being vaccinated; scurvy, once prevalent, is now greatly reduced; dysentery slays quite a number. Kaffirs are less complaining patients than white men, much less affected by ordinary pain than a white man is. In fact, they cannot have the same keen sensation of pain which the Caucasian generally possesses.

The Kaffirs have a predilection for gambling, as well as for drinking. A watch must be kept, lest some enlightened Kaffir, well-trained in the "pea and thimble" and card tricks, gets among the boys and robs them of all their money. Considerable mission work is done among them. The system on which this work is carried on is probably open to criticism, for the "mission Kaffir," as a rule, is not respected. There are exceptions, of course. The Christian Kaffirs go to church on Sundays; the heathen sun themselves in the compound park and get up their weird native war-dances.

Only a small number of the Kaffirs learn the English language. The white man must learn the language, to deal with them. A most remarkable patois has been concocted as a means of communication between the boys and their bosses. It is made up of a small per cent of pure Kaffir, a large per cent of Dutch with Kaffir terminations, while a spicing of English is thrown in to give it flavor. The white man is very proud of his linguistic accomplishment until he meets a raw boy, new to civilization; then his pride falls. The new boys have to learn the patois; it only takes them a few weeks to pick it up. When the boys talk pure Kaffir among themselves, the boss is "out of it," unless he has made a study of the language.

On the resumption of mining operations it was hoped that the cost per boy would be less than before the war. For a short time the cost was lower, but the figure has gradually gone up, until now it is more than in pre-war days. For instance, on one of the large mines the average total cost per month per native in compound, including wages and food and all cost in connection with natives (not including, however, the fees for recruiting), worked out £2 7s. 9.984d. in May, 1899, whereas in June, 1903, it was £2 8s. 6.46d.

The question of the punishment of Kaffirs is a delicate one to discuss, for fear of offending the sensibilities of those who have never seen a black man, and, therefore, consider him possessed of the same sentiments as a white man. It is my firm belief, after much observation, that the only way to really punish a Kaffir is to make him suffer physically. Imprisonment is, in the great majority of cases, no punishment at all. I regret that the Boer method of punishing a grave offence, namely, by whipping, is practically done away with. The inspectors have the authority of fining a boy for an offence. This is an improvement on imprisonment.

No mention has been made of the Native Pass Law, recruiting of natives, method of time-keeping, etc. These matters would require separate papers, to deal with them adequately.

THE ELEMENTS: VERIFIED AND UNVERIFIED.*

By CHARLES M. BASKERVILLE.

The first portion of the address was concerned with the development of the idea of atoms by which a definition of the term element was arrived at, after which an extended table of elements which have been proposed was submitted. The following statement was made after reference to the work of Lodge, J. J. Thomson and Crookes: "If the electrons of all elements are exactly alike, or, in other words, if there is but one matter, just as there is but one force, and if the elements be but the various manifestations of that one matter, due to a different orbital arrangement of the electrons, it would seem that we are fast returning to the conceptions of the middle-age alchemist. The transmutation of metals involves but the modification of the arrangement of the electrons."

The reasons for the large number of proposed elements were given, and especial emphasis was laid upon the difficulties in proving their claims: for instance, the extreme minuteness in which they occur, difficulty of their extraction, and the attendant cost, with the usual scientific poverty. Furthermore, if anything new is had, the difficulties confronting chemists in proving positively that the substance is truly new, was pointed out. Reference was made to the deficiencies of the spectroscope, the lack of uniformity in observations; difficulties to be overcome in comparing absorption spectra, advantages and disadvantages of phosphorescent and reversion spectra. Without doubt the spectroscopic criteria are the most valuable we have in judging finally the elements, and mayhap will remain so; but in my humble opinion such have not alone sufficient authority as yet to usher the aspirant to a place among the elect. The contention frames itself, however, in an expression of the need for uniformity.

Reference is made to suggestions as to the variability of atomic weights and the grounds upon which atomic weights were accepted. The speaker, however, quoted from Berthelot, "*La critique est facile, mais l'art est difficile,*" but especially emphasizes that all of our laws have their limitations.

It was suggested that some such institution, as, for example, the Carnegie Institution, should establish a commission for judging the claims of all novel materials as elements.

Having dealt with the speculations of others, the speaker indulged in a novel speculation of his own, that, whereas the density of the whole earth is about twice as great as the average density of the shell of the earth ten miles deep, there may exist undiscovered elements with very high atomic weights. Following out the general idea of the genesis of the elements, he stated that the logic of Larmor's theory, involving the idea of an ionic substratum of matter, the support of J. J. Thomson's experiments, the conformation of Zeeman's phenomenon, the emanations of Rutherford, Martin's explanations, cannot fail to cause credence in the correctness of Crookes' idea of a fourth state of matter.

These and the fact that most of the elements with high atomic weights, in fact all above 200 (thallium not reported on), exhibit radio-active properties, are doubtless closely associated, and have to do with the eventual composition of matter. The author has unverified observations which go to show the existence of at least one element with a very high atomic weight. If it be confirmed, then we have them now or they are making, and probably breaking up, as shown by that marvellous class of elements in the discovery of which the Curies have been pioneers.

The address closed with saying: "If our ideas that all known elements come from some priordial material be true, then it stands to reason that we are coming in time perhaps to that fixed thing, a frozen ether, the fifth state of matter. I may make use of dangerous analogy and liken our known elements, arranged in a perfected, natural system, as the visible material spectrum, while electrons, etc., constitute the ultra-violet and cosmyle composes the infra-red, either one of the latter, by proper conditions, being convertible into perceptible elemental matter."

*Address of retiring chairman of section C (chemistry), American Association for the Advancement of Science; St. Louis meeting, December, 1903.

THE AMERICAN MEETING OF THE IRON & STEEL INSTITUTE.

Mr. Bennett H. Brough, secretary of the Iron & Steel Institute of Great Britain, has recently issued a circular giving some details which have been decided on for the autumn meeting of the Institute, which will be held in New York, beginning October 24 next. Nearly 500 members of the Institute, including many who are prominent, have signified their intention of making the American trip, and arrangements are now being made for the steamer accommodations. The meeting in New York will be followed by excursions to Philadelphia, Pittsburg, Cleveland, Niagara Falls and Buffalo, and a party will also be organized to visit the St. Louis Exposition.

A committee of American engineers has been formed to arrange for a proper reception of the Institute. Mr. Charles Kirchhoff, of New York, is president of this committee, and Mr. Theodore Dwight, secretary.

CHETICAMP, CAPE BRETON.

By Fred. P. Ronnan.

Readers of the JOURNAL are no doubt interested in all promising new districts, and because of the fact that mineral deposits in Nova Scotia have not received very much attention in its columns lately, the following brief notes may be of interest in connection with the region known as Cheticamp. The rapid progress of Cape Breton as a field for extensive coal mining is perhaps better known than the possibilities which exist for successful development in connection with its copper, gold and silver deposits.

ABOVE COPPER OUTCROP, McLEOD GORGE, CAPE BRETON.

In the northern county of Inverness, Cape Breton, facing the gulf of St. Lawrence, the mining district of Cheticamp is situated, and has been known to local prospectors for the past 20 years, but, until lately, their labors have not been directed with any system, nor have they persisted long enough to determine the extent and value of the ores. Cheticamp is situated about 850 miles by water direct from New York, and northeasterly, and may also be reached by rail, which extends within 40 miles of this locality at the present time, but in a year or two will be tapped by the extension of Messrs. McKenzie & Mann's railway, beginning at Point Tupper, at the strait of Canso, which divides Nova Scotia from the island of Cape Breton. It may also be reached, with but two changes of steamer, by taking boat from New York to Halifax, thence over the Intercolonial Railway to Pictou, and by boat twice a week to Cheticamp.

The old French name—Isle Royale—was first applied to this region, and it is thus shown on the older maps. There are few mining districts in Nova Scotia which present more clearly all the earmarks of a valuable mineral country than Cheticamp. American mining engineers who have been here state that it more closely resembles, on a smaller scale, of course, the broken country which constitutes the main topographical features of Colorado.

The greatest elevation reached by the hills of Cheticamp is about 1,500 ft., and the land, from the shores of the Gulf of St. Lawrence inward, offers a succession of rises thickly wooded and intersected by several streams which empty into the gulf shore from their sources in the plateau and valleys far above. A prominent landmark at Cheticamp, and one which greets the visitor on arriving by water, is the striking feature which is presented in the annexed illustration, and is locally known as Mount Jerome; when once seen, it is likely to be well remembered; particularly when a visitor gets the glint of the setting sun across the face of this prominence, which rises to a height of 1,400 ft. As will be observed, an extensive talus lies at the foot of this mountain. The coast line is fringed by the middle, lower and metamorphic Carboniferous rocks which constitute the rolling undulating lands, and beyond this, toward the interior of the county, we find the rocks of the pre-Cambrian series, which constitute the hills of syenite and granite. Between these bold masses of earlier rocks we meet an extensive series of ore-bearing schists, of a chloritic hydro-micaceous and sericitic character. The long-continued travel of streams toward the coast has eroded this region into V-shaped gorges, affording numerous geological sections. An interesting section of the entire district is shown in the accompanying idealized sketch, for which I am indebted to Mr. M. V. Grandin. Many of the gorges reach a depth of 1,000 ft., and with such conditions it can be easily understood that there is a considerable field for the utilization of valuable water-powers for mining and other undertakings. These schists cannot be considered as crystalline, but may be assumed to be of sedimentary origin and highly metamorphosed; on the other hand, the indications of great movement are visible, compression and thrusting on a large scale being readily apparent. The schists are bounded, and penetrated, by felsites, porphyries and other igneous rocks. There is a certain order of succession among these schists, although the crumpling has made the structural geology of the district rather difficult to decipher. Crushing, thrusting, shearing, reverse faulting and other conditions all point to the previous occurrence of important earth-movements, such as are favorable to mineralization.

Beginning with the lower schist, we meet a geological horizon which contains deposits of galena and silver ores; these have been partly prospected and exploited. Higher up, the schists alter in their character and contain pyrrhotite, arsenopyrite and promising values in gold and silver. Assays made from average samples have carried as high as $90 in gold,

MOUNT JEROME, CHETICAMP, CAPE BRETON.

which has been found in mispickel. Still higher up the pyrrhotite is absent, and we find the beginning of a third horizon, which, while carrying arseno-pyrite, also shows chalcopyrite and iron pyrite.

At the highest point so far prospected, there is a wide zone of mineralized schist carrying sulphide ores of copper, largely chalcopyrite, and practically free from arsenical contents. At this elevation, say 1,300 ft. above sea level, the oxidation is comparatively limited, there is little or no gossan, and while carbonates and oxides of copper ore are met with, their distribution is very shallow, relative to the great depth of proved sulphide impregnation.

During 1903 considerable development work was done by two companies, and from all appearances they have undertaken their work on a systematic basis, having as an object the proving of the various ore-bearing schists which are such a strong feature of this district. The most advanced enterprise, as regards development, is known as the Grandin Brook copper deposit, and comprises a zone of ore-bearing strata which so far shows a thickness of about 355 ft. The strike of this deposit is approximately NE-SW, with an average easterly dip of about 45°, and a 5° pitch to the south. The strike has been proved for about 1,100 ft., and indications point to its extension for another 1,500 ft. This copper deposit is owned by the Eastern National Copper Company, Ltd., of Halifax, and as a result of vigorous development work they have opened up a body of ore estimated to contain 260,000 tons, which is practically available for treatment. This has involved the sinking of a slope at the outcrop, which has now reached a depth of about 150 ft. The work proposed for 1904 involves the sinking of this slope to a depth of 250 ft., and the driving of another parallel slope, at a distance of 1,000 ft. south, cross-cutting at the bottom and then connecting these workings by a drift.

The character of the ore may be summarized as a low-grade chalcopyrite, finely disseminated, running from one to six per cent in copper, and from $1.50 to $2 each in gold and silver per ton. The average assay of the past year's samplings gives $10 per ton in total contents; and while, a few years ago, such material would be considered low-grade, it is hardly so to-day, when we consider the rapid growth in the treatment of this class of ores.

The Granby Consolidated Company, in the Boundary district of British Columbia, is working similar ores of an average value of $4.34. and is netting $1 per ton. The ores of the Cheticamp district appear to be essentially of a concentrating character, and the copper-bearing schists, in particular, could be relieved of their rather high percentage of silica, and the sulphur contents brought up to a point which would adapt them to pyritic smelting.

From tests made recently on these ores it would appear that the ore concentration process would give satisfactory results; as high as 94.4 per cent of the copper contents have been recovered in this way, although the gold and silver were not so readily concentrated. So far, in these copper deposits, there appears to be no evidence of secondary enrichment, and the permanent sulphides are found below the surface covering of oxidized ores.

Space does not permit of a full description of the many features which combine to make this district a most interesting one. Glacial denundation is comparatively absent, and this is a feature which differentiates it from most mining districts in Nova Scotia. There are several other mining companies carrying on development work which may be described in a later communication, but the writer would advise mining men to look into the possibilities of this district on account of its prospective value as a place for a large mineral industry in which an almost unlimited supply of profitable ore can be reasonably depended upon. Many years ago free gold was panned from time to time in the alluvial of the rivers which traverse this region, and it is now generally accepted that this gold was set free from the more complex ores which are characteristic of the higher country.

THE ENGINEERING BUILDING.

This important project is undergoing a revival of discussion by reason of the adverse attitude assumed by a number of the members of the American Society of Civil Engineers, one of the beneficiaries to Mr. Carnegie's gift. The matter is to be decided by a letter ballot, which will close on March 2. During the interim the subjoined appeal has been sent out by one of the members of the Society:

To the Members of the American Society of Civil Engineers:

I hope that my brother-members will not take amiss this appeal for careful consideration of the 'Statement of the Board of Direction in the matter of the Proposed Union Engineering Building' before casting their ballots.

As at first presented, the proposition did not commend itself to the judgment of many of us, possibly because of the inadequate manner in which it was brought to our attention. But since the Board of Direction was authorized to prepare a statement to accompany the resolution for a letter ballot, the suggestion of Mr. Carnegie has taken an ampler and a more definite form. It is now virtually a project for the establishment of a university in which the application of science and of the useful arts to the uses of civilization by the engineering professions may be worthily demonstrated. If carried through successfully, it will not only be a monument to the liberality and the foresight of the man who has made it possible, but also to the spirit of enterprise which has elevated this country to the first rank of nations.

We cannot hope to vie with the great nations of Europe in picture galleries and museums whose claims to our admiration rest upon deeds of the past, but we may justly be proud of what American engineers have done in controlling the forces of Nature for the future welfare of mankind. Their masterpieces cannot be contained within four walls. They are spread over the whole earth. But the records of their glory can be housed within a single building, on the scale that is here proposed. Under the same roof that shelters them may be collected and systematized the growing mass of information on engineering subjects, published in many languages and places, which would be otherwise unavailable to the members of any one of the societies. It would also be, in a certain sense, a professional arena in which the latest ideas in the several branches of engineering would be discussed and where the wheat would be winnowed from the chaff by men recognized as leaders in their specialties.

Let us keep one fact clearly in mind; that this is not a question of amalgamating the American Society of Civil Engineers with other engineering societies, but of closer association for their mutual welfare. Our society is what its members have made it, and so it will continue. We have nothing to fear as to its prosperity or as to the estimation in which it is held, either at home or abroad, from propinquity to the other societies.

The possibilities that this project offers for securing the best results with the least expenditure of time and labor ought not to be lightly set aside. Think of its value to the younger members of the engineering professions in this country, and think, too, of the impression which such a structure would make upon foreign visitors! To them it would seem a fitting symbol of the place which these professions hold in the estimation of the American people. Nor should the advantages be underestimated that are to be derived from the proximity of the Engineering Club. The opportunities for social amenities between members of the several branches of the profession must work toward a closer affiliation among those, who by separate avenues, approach a common goal.

The arguments for and against the proposition are so fairly stated by the Board of Direction that nothing more is needed to enable us to vote intelligently upon it; nothing except to approach it with an open mind. Those of us who in the course of years have passed beyond the active practice of our profession, and who have gained about all that we might expect to derive from such a project, should consider what it offers to our younger brethren, and, in casting our ballots, should keep their interests foremost in our minds. Nor should we forget that narrow views on important questions rarely prove to be correct.

If, in your opinion, this project be a worthy one, do not fail to do all in your power to make it a success; for, if this opportunity be lost, another like it may never occur again.

Very truly yours,

H. S. HAINES.

New York, Feb. 10, 1904.

EFFECT OF IMPURITIES ON COMMERCIAL COPPER.

E. A. Lewis reports (*Engineering*, December 4, 1903; *Journal* Society Chemical Industry, December 31, 1903, p. 1351) that the addition of 0.2 per cent of lead or bismuth to pure copper makes the metal so brittle that it cannot be rolled. Bismuth is more injurious than lead, even 0.002 per cent making copper brittle. Copper containing 0.2 per cent of arsenic, phosphorous or tin can be rolled hot and is very malleable. With 0.2 per cent of antimony or zinc, it frequently cracks at the edges when rolled. As much as 1 per cent cuprous oxide does not affect the malleability, if no other impurity be present. The injurious effect of bismuth, lead and antimony is neutralized to some extent by the addition of arsenic, but is intensified by tin, manganese or aluminum. However, 0.5 per cent of manganese or aluminum is capable of neutralizing the injurious influence of 0.1 per cent of sulphur.

Copper to be used for boiler tubes, etc., should meet the following requirements: (1) Ordinary refined should contain 99.6 per cent Cu, not more than 0.1 per cent Pb or As, or 0.05 per cent Sb, less than 0.005 per cent Bi, and about 0.1 to 0.2 per cent oxygen, according to the amount of other impurities present. (2) Arsenical copper should contain at least three times as much arsenic as lead and bismuth, but in no case more than 0.6 per cent; arsenical copper is harder and tougher than ordinary refined, and has a higher textile strength, both at the ordinary temperature and at 250° C. (3) Phosphorized copper should contain 99.7 to 99.8 per cent Cu, 0.05 to 0.1 per cent P, and not more than 0.04 per cent O; it is harder than ordinary copper. (4) Copper containing 2 to 3 per cent Ni or Mn is harder and has a higher tensile strength than ordinary copper; it should not contain more than traces of lead or antimony.

'Alteration' is a partial change of substance in a mineral or rock.

FLORIDA PHOSPHATE TRADE.

The supremacy of Florida phosphates in the markets of the world, as a result of their good quality, has not been seriously impaired by the development of other domestic and foreign deposits. The Florida product, with two or three minor exceptions, is the highest priced on the market; moreover, the ocean freight rate from Florida or Georgia ports to Europe is often equal to nearly 50 per cent of the f. o. b. price of the phosphates, and sometimes more. Still, the yearly exports are over 500,000 tons, and in 1903 were 617,981 tons, principally to superphosphate manufacturers in Germany, Italy, France and Great Britain. These exports constituted 78.7 per cent of the total exported by the United States, the balance being Tennessee and South Carolina phosphates.

Of the 617,981 tons exported by Florida, over 75 per cent, or 465,520 tons, was 78 to 80 per cent hard rock, which sold 6 to 7¾d. per unit ($9.48@$12.25 per ton) delivered at European ports. Germany received, direct or through Holland, nearly 70 per cent, or 320,104 tons, of the hard rock exported. This is 24,222 tons less than was reported in the record year, 1902. Land pebble (68 to 73 per cent) exports in 1903 amounted to 152,461 tons, an increase of 9,000 tons over 1902, and were chiefly to France and Italy—markets in which the Algerian phosphates are competitors. These land pebble shipments were on orders taken at about 4¾ to 5¾d. per unit ($6.65@$8.05 per ton), delivered, prices that compare with 4¾@6¼d. per unit ($6.56@$8.63 per ton), for the best grade of Algerian.

Domestic shipments are principally in pebble phosphates, notably to Baltimore, Md., and Carteret, N. J.

The shipments in 1903 are given below, in detail, in long tons:

Destination.	Hard rock.	Land pebble.	Total.
Australia	.....	3,000	3,000
Austria	9,000	.....	9,000
Belgium	35,400	.....	35,400
Denmark	11,870	.....	11,870
France	5,865	38,755	44,620
Germany	246,824	27,940	274,764
Great Britain	43,271	28,526	71,797
Holland	73,280	.....	73,280
Italy	18,542	36,430	54,972
Japan	.....	2,700	2,700
Spain	5,606	.....	5,606
Sweden and Norway	15,862	15,110	30,972
Domestic (by water)	2,352	158,147	160,499
Peace River pebble (dom.)	.....	.....	65,655
Total, tons	467,872	310,608	844,135
Total, 1902	492,610	345,344	845,024

A point of interest is that the deficiency shown in the hard rock and land pebble shipments—59,474 tons—was nearly made up by the increased movement in Peace River pebble. The rebuilding of the Peace River plant, destroyed by fire in 1902, had a beneficial effect on the industry, although the bulk of the output is consumed by the owner, the American Agricultural Chemical Company, the northern fertilizer combination.

The hard rock in 1903 was reported chiefly by the Dutton Phosphate Company, Schilmann & Bene, J. Buttgenbach & Co., and the Dunnellon Phosphate Company. The land pebble was shipped principally by the firms in the Joseph Hull agreement, the Palmetto Phosphate Company, and Schilmann & Bene.

QUICKSILVER IN RUSSIA.—According to a special report furnished by Mr. W. A. Abegg, of Warsaw, the production of quicksilver by Russian mines in 1903 was 22,110 poods, equivalent to 362 metric tons. The output in 1902 was 416 tons.

IMPORTS OF CHEMICALS AND MINERALS.

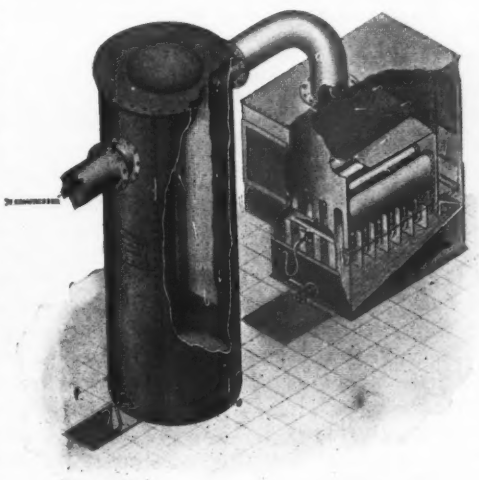
Notwithstanding an increasing domestic production of chemicals, the United States continues to buy from different foreign countries. In 1903 the United States imported $28,092,428 worth of chemicals and kindred minerals, of which $358,037 was re-exported, leaving for consumption $27,734,391. Compared with 1902 this is an increase of $3,343,768, or 13.2 per cent, the result almost entirely of an unprecedented demand for nitrate of soda. Some idea of the magnitude of our foreign trade in chemicals is given by the table below:

Substance.	1903. Imports.	Re-exports.	1903. Consumption.	1902. Consumption.
Asphalt, tons, dutiable	167,554	1,605	165,849	137,014
Bleaching powder, lb., dutiable	113,285,240	836,411	112,448,829	112,171,684
Cement, lb., dutiable	927,180,235	10,144,782	917,035,453	785,157,534
Clays or earths, tons, dutiable	203,173	88	203,085	191,641
Graphite, tons, free	15,962	63	15,899	18,228
Manganese ore and oxide, tons, free	146,056	15	146,041	235,466
Potash, chlorate, lb., dutiable	468,042	135,024	333,018	1,045,164
Potash, muriate, lb., free	179,337,673	758,404	178,579,269	140,532,654
Potash, nitrate, lb., free	13,835,668	391,950	13,443,718	9,861,215
Potash, all other, lb., free	70,205,850	14,527	70,191,323	91,846,913
Phosphates, tons, free	132,965	....	132,965	137,386
Pyrites, tons, free	427,319	1,330	425,989	434,259
Salt, lb., dutiable	314,401,480	7,804,215	306,597,265	375,239,800
Soda ash, lb., dutiable	21,859,365	26,706	21,832,659	27,809,937
Soda, caustic, lb.	2,970,786	1,116,354	1,854,432	1,991,565
Soda, nitrate, tons, free	272,947	4,417	268,530	201,570
Soda, sal, lb., dutiable	3,454,005	3,324	3,450,681	4,016,662
Soda, all other, lb.	14,272,646	42,540	14,230,106	27,757,099
Sulphur, tons, free	188,888	967	187,921	175,698

It is interesting to add that the crude materials imported are controlled chiefly by combinations, and in the cases of brimstone from Sicily, nitrate of soda from Chile, and potassium salts from Germany, the monopoly is complete. In several of the more important chemicals, also, trade agreements already exist. In some branches of the trade Americans are now exporting their products in competition with European manufacturers.

AN AIR WASHER FOR COMPRESSORS.

When air-compressors work in a dusty atmosphere it is desirable that the air should be cleaned or washed before it is compressed.



AIR WASHER FOR COMPRESSORS.

Special apparatus for this purpose has recently been designed by the firm of A. & Z. Daw, of London. One of these washers has just been supplied for an air-compressor built by the firm for the mines of the Ashanti Gold-fields Corporation, on the Gold Coast in West Africa. The compressor itself is steam driven, and is of the cross-compound, two-stage type; it will compress about 165,000 cu. ft. of air per hour, to 90 lb. pressure.

The general construction and arrangement of the apparatus are shown in the accompanying engraving. The inlet openings are covered with wire-gauze, and are placed at opposite ends of the washer, to balance any suction pressure on the surface of the water. The air passes down through the end vertical channels, and is distributed, through five horizontal troughs, over the surface of the water in the washer. Slots are cut in the side-plates of each of the troughs; the air, passing through these slots, is split up into thin streams and thoroughly washed by the water, which should normally cover the slots to a depth of 3 in. Vertical baffle-plates are arranged along the troughs, to prevent swishing of the water, while horizontally inclined baffle-plates are so placed as to arrest any particles of water which may be carried up by the air. A sludge-cock is fitted for the purpose of washing out periodically the sludge, or dirt, which may accumulate in the washer. As a further precaution, a vertical water separator is introduced between the washer and the compressor.

Before the washer was shipped to Africa, a special test of its efficiency was made. Hoppers were fixed in front of the wire-protected openings, and fine coal-dust was fed into them; while the compressor was run at its full speed, 90 revolutions per minute, for about 20 minutes. The pipe which leads the air from the low-pressure cylinder in the compressor to the intercooler was disconnected, while in its place there was fixed a large, clean duck bag. All the air from the low-pressure cylinder had to pass through this bag during the trial. About 160 lb. of coal-dust was fed into the washer, and, so far as observation was possible, every particle of the coal-dust was separated in the washer. The bag was quite clean at the end of the run, showing that none of the dust had reached it.

This appliance should be found useful at many mills and mines where air-compressors are used. Clean air is desirable, and the apparatus seems simple and practical.

GOLD MINING IN LAPLAND.—The alluvial deposits of Russian Lapland, which yield a small quantity of gold annually, are found along the Ivalo and tributary streams (*Oesterreichische Zeitschrift für Berg-u. Hüttenwesen*, January 24, 1904). The Ivalo rises in Norwegian territory and flows easterly into Enare lake. The richest placers occur in the middle course of the river near Kultana. Washing is carried on during the summer months by the natives living in the vicinity, who are mainly engaged in agricultural occupations. The average recovery of gold is about 2 grams per cubic meter. Gold-bearing quartz veins have recently been found in the hills south of the Ivalo valley, and, as the glacial sheet moved northward in this region, they are probably the source of the alluvial deposits. The quartz is too low grade to repay working.

RECENT LITERATURE ON ECONOMIC GEOLOGY.—I. IRON ORES.

By EDWIN C. ECKEL.

Crosby, W. O. 'Geological History of the Hematite Iron Ores of the Antwerp and Fowler Belt in New York.' *American Geologist,* vol. xxix, pp. 233-242; also in *Technology Quarterly,* vol. xiv, pp. 162-170.

The author discusses the field relations and probable genesis of the red hematite ores of the western Adirondacks, in Jefferson and St. Lawrence counties, N. Y.; and concludes that they originated through the alteration of sulphides which had been magmatically concentrated along the border of a dike. "The orebody of the Sterling mine is in a dike, 50 ft. or more in width, of some highly altered basic rock, possibly diabase; the ore was originally a magmatic segregation of this rock, chiefly in the form of sulphides, which have consequently suffered more or less complete oxidation to a considerable depth, the ore being now virtually a gossan; the dike is probably continuous for the entire length of the belt of the mines, although absolute continuity is by no means essential to the hypothesis."

This dike is bordered by granite on the southeast and by crystalline limestone on the northwest. In earlier work on these ore-deposits C. H. Smyth decided that the chloritic dike rock was merely a highly altered phase of the granite.

Keith, A. 'Iron Ore Deposits of the Cranberry District, North Carolina-Tennessee.' *Bulletin* 213, United States Geological Survey, pp. 243-246.

The principal ores of this district are magnetites, which occur as a series of large lenses in granite. The author regards them as replacements of some basic intrusive, the process of ore-deposition having taken place after the deformation which made the granite schistose. The ores carry 42 to 46 per cent metallic iron; but the gangue consists largely of pyroxene, hornblende and epidote, so that cleaning and concentration are rather difficult.

Shedd, S. 'The Iron Ores of Washington.' Vol. 1, Washington Geological Survey, pp. 215-256.

Deposits of magnetite, hematite, limonite and magnetite mixed with hematite occur in the State of Washington, chiefly in Skagit, King, Kittitas, Stevens and Mason counties.

Along the Skagit river from Hamilton to Marblemount, Skagit county, a series of magnetite-hematite bodies occur. These are probably separate lenses, though having a certain parallelism of outcrop. The ores are dark colored, massive, and more or less magnetic. The ores carry from 29.11 to 46.60 per cent metallic iron; 7.31 to 14.28 per cent manganese oxide; 0.25 to 2.43 per cent phosphorus pentoxide. A certain amount of development work has been done in this district, and several coal beds of good grade occur in the vicinity of Hamilton.

In King county deposits of magnetite occur near Snoqualmie Pass, being associated usually with beds of cyrstalline limestone. These ores range from 62.45 to 68.54 per cent metallic iron; 1.89 to 5.78 per cent silica; with very low sulphur and only traces of phosphorus.

Magnetite-hematite deposits occur in the Clealum district, Kittitas county. While high in metallic iron (46.24 to 57.12 per cent), the Clealum ores carry 5.54 to 15.58 per cent silica and 1.92 to 25.95 per cent alumina. Their relations and genesis have been fully discussed by Smith and Willis (*Transactions* American Institute Mining Engineers, vol. xxx, pp. 356-366).

Near Colville and Valley, in Stevens county, hematite and limonite bodies occur in limestone and porphyry. These ores carry from 50.48 to 68.10 per cent metallic iron; 0.36 to 0.72 per cent phosphorus pentoxide, and 0.21 to 0.38 per cent sulphur.

Of all the deposits described in this report, few have been developed sufficiently to permit any estimate of size being made. Most of them are, moreover, situated far from existing railroads.

Spurr, J. E. 'The Original Source of the Lake Superior Iron Ores.' *American Geologist,* vol. xxix, pp. 335-349.

The author meets the objections of Van Hise and Leith to giving the name 'glauconite' to the green ferrous silicate which all admit was the original source of the Mesabi ores, by comparing the material with various undoubted glauconites. Though the Mesabi silicate is low in potash, it is nearer in this regard to the Australian and French glauconites than they are to that from Grodno, Russia. Recalling Murray and Renard's observation that the potash content of recent glauconites varies with the composition of the coastal rocks, the author shows that the surface, at the time of deposition of the Mesabi silicate, consisted of rocks very low in potash; and finally concludes that the Mesabi silicate is entitled to the name glauconite.

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

Report of the Commissioner of Education for the Year 1902, Volume 2. Washington; Government Printing Office. Pages, 1,280.

The Mining Industry of North Carolina during 1902. By Joseph Hyde Pratt. Raleigh, N. C.; Public Printer. Pages, 28.

Gems and Gem Minerals. By Oliver Cummings Farrington. Chicago; A. W. Mumford. Pages, 230; illustrated. Price, $2.50.

California Mines and Minerals. Compiled by Charles G. Yale. San Francisco; issued by the California State Mining Bureau. Pages, 36.

United States Geological Survey. Clay-working Industries of the United States in 1902. By Heinrich Ries. Washington; Government Printing Office. Pages, 84.

The Thermal Efficiency of a Rotary Cement Kiln. By Joseph W. Richards. Bethlehem, Pa.; reprinted for the Author from the *Journal* of the American Chemical Society. Pages, 12.

Album of Drawings Relating to the Manufacture of Open-hearth Steel. Part 1. Open-hearth Furnaces. By M. A. Pavloff. Ekaterinoslav, Russia; published for the Author. Atlas form, 52 plates.

The Elements of Mining and Quarrying. By Sir C. Le Neve Foster. London; Charles Griffin & Company, Ltd. New York; THE ENGINEERING AND MINING JOURNAL. Pages, 324; illustrated. Price, $2.50.

Geological Map of the Boulder Reef, Eastern Coolgardie Gold-field, Western Australia. Prepared by A. Gibb Maitland and W. D. Campbell, Perth, W. A.; Government Printer. Three sheets, 37½ by 25 in. each.

Anthracite Coal Communities. A Study of the Demography, the Social, Educational and Moral Life of the Anthracite Regions. By Rev. Peter Roberts. New York; the Macmillan Company. London; Macmillan & Company, Ltd. Pages, 388; illustrated. Price, $3.50.

Field Columbian Museum, Geological Series. No. 77. Catalogue of the Collection of Meteorites. By Oliver Cummings Farrington. Pages, 44; with 10 plates. *No. 78. The Osteology of Nyctosaurus, with Notes on American Pterosaurus.* By Samuel W. Williston. Pages, 36; with 4 plates. *No. 82. The Structure and Relationship of Opisthocœlian Dinosaurs.* By Elmer S. Riggs. Pages, 32; with 8 plates. Chicago; published by the Field Columbian Museum.

BOOKS REVIEWED.

Trust Companies of the United States, 1903. New York, 1903; published by the United States Mortgage and Trust Company. Pages, 228.

This book contains a list of the trust companies doing business in the United States in 1903, with information as to their financial standing. The volume is attractively bound, and the material conveniently arranged for ready reference.

Electrically Driven Shops. By Robert L. Warner. Pittsburg; published by the Westinghouse Electric & Manufacturing Company. Pages, 50; illustrated.

This is a very suggestive paper, describing recent progress in the use of electric motors for direct driving of machines. Various kinds of machines are mentioned which are now being successfully driven by motors, with information as to the relative economy secured over the ordinary system of shaft and belt driving.

Mineral Tables. By Arthur S. Eackle. New York: John Wiley & Sons. Pages, 73. Price, $1.

This is a conveniently small book containing a complete set of tables for the determination of minerals by their physical properties. The tables include the common minerals, and a few others of local prominence which are generally considered as rare in occurrence. The minerals are arranged primarily according to streak and color, as seen in the analytical key, and under each color the arrangement is according to hardness. The tables differ from those of Weisbach chiefly in disregarding luster as an important division and in maintaining the same system of arrangement throughout. This book gives, in convenient form, the name, composition, color, luster, hardness, system, cleavage, specific gravity, structure and notable features of all the minerals ordinarily encountered in mining, and ought, therefore, to be serviceable to mining men.

Transactions of the Association of Civil Engineers of Cornell University. Vol. XI, 1902-1903. Ithaca, N. Y.; published by the University. Pages, 99; illustrated.

The present issue of this annual contains the usual information regarding the Association of Civil Engineers of Cornell University, together with a number of papers on various engineering topics contributed by members. A list of the contributions is as follows: 'The Field of Bridge Engineering and Essentials Necessary for Successful Practice;' 'Comparative Tests of Plain and Riveted Plates;' 'The Development of the Portland Cement Industry;' 'Some Hydraulic Resistances;' 'Dynamometer Tests on the Canadian Pacific Railroad;' 'Water Rights;' 'The Investigation of the Baltimore Sewerage Commission;' 'Fireproof Building Construction.' The volume compares very favorably with similar publications issued by other technical schools.

Irrigation Engineering. Fourth edition, revised and enlarged. By Herbert M. Wilson. New York; John Wiley & Sons. Pages, 573; illustrated. Price, $4.

This work has already established a wide reputation as the standard treatise on irrigation, and it needs no introduction to our readers. The present edition does not differ radically from the preceding issue, although new material has been included in some of the chapters and the text revised to conform with recent developments of irrigation engineering. The greatest change has been made in the part dealing with storage reservoirs, this being rendered necessary by the notable construction works, such as the Assuan reservoir, the rock-fill dams of California and other developments in the West, which have recently been brought to completion. There is no branch of engineering, probably, that has more possibilities for the future than irrigation, and we are sure that all members of the profession will welcome this work in its new form.

Annual Report of the Mine Inspector for Indian Territory, 1903. William Cameron, Inspector. Washington; Government Printing Office. Pages, 171; with maps.

The coal mining industry of Indian Territory is great and is rapidly growing. No better proof of its importance need be cited than the fact mentioned in this report—the output of fuel-oil in Texas has had little effect on the Territory's production of coal. Everything indicates a prosperous future for the industry. The general character of the seams worked, the mining methods used, etc., were described recently in the ENGINEERING AND MINING JOURNAL, but the statistics in this report contain some interesting particulars which may be briefly summarized.

It appears that the total output of coal in the fiscal year ending June 30, 1903, was 3,243,692 tons, of an estimated value of $5,371,146, the average mine selling price being $1.70. The total number of coke-ovens reported was 280, yielding 52,625 tons of coke, having an average selling price of $4.15 per ton. In the previous year the output of coal was 2,741,797 tons, and of coke 49,279 tons. There are 120 producing-openings in the Territory. The total number of men and boys employed in the last fiscal year was 6,091, of whom 4,820 were employed underground. The rate for miners is 65c. per ton for mine-run, with an eight-hour day. There were no serious disturbances. Many mines in the Territory are gaseous, and need thorough ventilation, which, in the majority of cases, is by fans. The pamphlet gives particulars about the equipment of a large number of mines, stating makes of machinery, etc. The inspector calls attention to the need of a better grade of oil for mine lamps, and the absurdity of a law requiring the use of shot-firers, which says "shots shall not be fired to exceed one per day." The inspector observes that this measure would restrict the output of the largest mine in the territory to about five tons a day, and, accordingly, has interpreted the law to mean but once per day.

The Polar Planimeter and its Use in Engineering Calculations; together with Tables, Diagrams and Factors. By J. Y. Wheatley, New York; the Keuffel & Esser Company. Pages, 114; with 14 plates, diagrams and tables.

Although the polar planimeter is in general use for many purposes, comparatively few engineers are familiar with the theory of this simple and accurate aid to difficult calculations. This book explains clearly the principles on which the construction of the instrument is based, and the many uses to which it may be put in determining the volumes of earthworks, reservoirs and natural basins, in measuring large and small areas and similar operations. The theory is evolved without the use of higher mathematics, in a logical and thorough way. From the theoretical explanation the author has added examples of actual determinations with the instrument, with a view of presenting typical cases involving all the necessary steps in solving similar or related problems. A description of the various forms of simple and precision planimeters and integrating machines is given in the last chapter.

Suplee's Mechanical Engineers' Reference Book. By Harrison H. Suplee. Philadelphia and London; the J. B. Lippincott Company. Pages, 836; with diagrams. Price, $5.

At first sight, an addition to the existing list of pocket-books and reference books might seem superfluous; but this book has special and valuable features of its own. While it is primarily designed as a successor to the pocket-book compiled many years ago, by the late John W. Nystrom, Mr. Suplee has enlarged the sphere of such books by showing more of the cost and methods of using the information given, as well as furnishing information for a designing engineer. Problems are summarized from an economic point of view.

The subjects treated in the book are: Mathematics, Mechanics, Materials of Engineering, Strength of Materials, Machine Design, Heat, Air, Water, Fuel, Steam, Steam Boilers, Steam Engines, Internal Combustion Motors, Electric Power, Cost of Power and Works Management. After each general subject treated, lists of books are given for further reference, so that a method is outlined for a more detailed study than a hand-book affords.

The article on Works Management discusses methods of determining wages to be paid in a shop, cost keeping and the components of the general expense. A table shows the effects of different rates of depreciation for terms of years ranging from one to 30. Diagrams illustrating the subjects are frequent and make the descriptions readily understood. This part of the book is especially valuable to the engineer and manager.

Apart from this, the work gives the latest results of experiment, and the latest compilations of statistics and information; while the bibliography of various subjects is a feature which will attract many users. A thumb-index indicates the classification of subjects and makes it physically easy to open the book at quite nearly the right place, while a good index shows where sub-divisions may be found.

The Improvement of Rivers. A Treatise on the Methods Employed for Improving Streams for Open Navigation, and for Navigation by Means of Dams and Locks. By B. F. Thomas and D. A. Watt. New York; John Wiley & Sons. London; Chapman & Hall, Ltd. Quarto, 370 pages; illustrated. Price, $6, net.

Engineers have long recognized the value it would be to the profession to have a treatise covering the principal features of that branch of engineering pertaining to the improvement of rivers. This branch comprises a great variety of works; locks and dams for canalization; dikes and jetties for concentrating and controlling streams and bank protection in regularization; levee-building and storage reservoirs for the prevention of inundations, and dredging and snagging for keeping channels open during times of low water. This is especially the case in this country, where our numerous navigable streams—and streams which can be made navigable by proper treatment—have played an important part in the development of the country. Undoubtedly, such a book has been needed, and it may be said that this is the first work in the English language devoted to the subject.

The object of the work is to provide in concise form a description of the various systems employed for bettering the condition of navigable streams, together with the methods usually adopted for their design and execution. It has been the endeavor to include all the important points of design and construction which are liable to be met with, and all calculations have been so simplified as to bring them within the range of those who are not technically educated, yet whose services are most valuable on river work by reason of their practical experience and good judgment. The fact that a book is written in plain language should not detract from its usefulness to the man of education. This branch of engineering is little taught in the engineering schools of this country, although it offers a most excellent field for young men of ability, and it is hoped that this treatise will help to widen the scope of the usual engineering course and prepare students for entering the engineer service of the government through the junior engineer grade of the civil service. With this object in view hydrographic surveys, reports and examinations have been treated at some length.

The authors have both had much experience in river work, especially in canalization, or the improvement of natural water-courses to the navigable point. This important subject receives full attention. They have also made good use of such papers and monographs as have been published by engineers, in government and corporate service, on special improvements. The book is fully illustrated, and contains a great deal of information.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Letters should be addressed to the EDITOR.

We do not hold ourselves responsible for the opinions expressed by correspondents.

A Disclaimer.

Sir.—There has just come to my hand a circular prospectus of the Crown King Mines Company, J. L. McLean & Co., fiscal agents, in which my name is used without authority. Please make known to your readers that I do not consent to the use of my name therein, nor do I vouch for any of the figures or statements contained in said prospectus.

Thanking you for giving due prominence in your next issue of the JOURNAL to this notice.

SAMUEL W. OSGOOD.

Chicago, Feb. 8, 1904.

The Card Index.

Sir.—Mr. R. J. Welsh, in his letter in the Correspondence column of the JOURNAL of January 14, has mentioned a difficulty which, I have no doubt, has been experienced by every engineer who makes any attempt to systematize the information that he gathers on various subjects. Each, to a great extent, must solve the problem himself to meet his individual needs and to suit his surroundings; but, as most engineers stay but a comparatively short time in any place, a system, to be efficient, must reduce to a minimum the bulk and unwieldiness of his accumulations. In a magazine like the ENGINEERING AND MINING JOURNAL this bulk increases so rapidly that the subscriber of a few years' standing has accumulated such a mass of paper that to move it is a great trouble and involves considerable expense, and, at the same time, any information that he may require has become so buried under the mass of useless and dead matter as to be of comparatively little value. I have overcome this difficulty in the following manner, and have found that by this system any information that may have been gathered on any subject is immediately available, without the trouble and annoyance of wading through a lot of extraneous matter that may be valuable in itself, but which may be altogether foreign to the subject in mind. I have arranged a series of files, each to cover a certain range of subjects and each sub-divided into pockets, alphabetically indexed, somewhat like an ordinary letter filing case. These files are numbered and the name of the sub-division printed thereon, to facilitate filing, and the matter they contain is indexed in a card index cabinet arranged to suit the requirements. In all magazines received there is a large proportion of the bulk that is only of current interest, such as advertisements, etc., and it is of no value whatever after it is a few weeks old. I usually keep two or three weeks' numbers for current reading, but after the expiration of that time I go through them and mark all articles that are of interest and that may be of value in the future. These are then removed from the other matter as completely as possible—preferably I have found by removing the binding staples—and placed in the proper files and indexed in the card cabinet. The main advantage of the card system is that the more information you gather and the more you differentiate the index, the simpler it becomes and the more readily are items found in it. Of course, many articles removed in this way it would be impossible to separate entirely from other matter printed on the same sheet, but this can be indexed also in sufficient detail to make it very easily found when wanted.

This card index I also use for the indexing of catalogues under various arrangements, and have even carried it into the field of my library, to facilitate the following up of any subject, by marking anything of especial interest, when I am reading a book, and afterward having it indexed. All maps and drawings are also indexed in this way, and I also file and index current pamphlets of the American Institute of Mining Engineers to which I might wish to refer before the annual volume is issued, and when this volume appears the pamphlets may be removed and the entry erased from the card.

W. MORTON WEBB.

Leadville, Colo., Feb. 2, 1904.

ABSTRACTS OF OFFICIAL REPORTS.

Mount Morgan Gold Mining Company.

This company owns one of the great gold mines of the world, at Mount Morgan, in the State of Queensland, in Australia. Its latest report covers the half-year ending November 30, 1903. The capital stock is £1,000,000, in shares of £1 each. The profit and loss account is as follows:

Receipts from gold	£221,121
Receipts from copper	4,260
Miscellaneous	1,469
Total receipts	£226,850
Working and general expenses	£153,919
Royalty and taxes	6,193
Total expenses	£160,112
Net balance for half-year	£66,738
Surplus from previous half-year	36,328
Total	£103,066
Dividends paid, 7.5 per cent	75,000
Balance forward	£28,066

The mining report shows that in the open workings 95,753 tons of overburden were removed, and 138,534 tons of rock taken out, from which 62,349 tons of pay-ore were sorted. From the underground workings the total taken out was 66,172 tons, of which 59,970 tons was pay-ore, 301 tons sulphur ore and 5,901 tons waste.

In the reduction works there were treated 60,290 tons sulphide ore, 63,527 tons oxidized ore and 13,914 tons old tailings. The result obtained at the different works were as follows:

	Tons ore.	Oz. fine gold.	Oz. per ton.
Mundic Works	60,290	25,360	0.42
West Works	63,527	25,572	0.40
Lower Works	13,914	1,550	0.11
Total	137,731	52,482	0.38

The quantity of water used for the half-year was 80,114,323 gal. The rainfall was 13.96 in., and there was 134,250,000 gal. in the reservoir at the close of the year.

At the different reduction works the cost per ton was as follows, reduced to United States currency:

	West Works.	Mundic Works.
Crushing	$0.5974	$0.5414
Roasting	0.6626	1.2796
Chlorination	0.7480	0.9744
General	0.2956	0.3746
Total	$2.3036	$3.1700

The West works treat oxidized ore; the Mundic works the sulphides, or pyritic ore.

Manager G. A. Richard's report says: "By far the most important work undertaken has been the prospecting of the lower levels by means of the diamond drills. Operations have been confined principally to the 750-ft. level, the boring being mainly horizontal, and the result of the explorations is the most important discovery of recent years, and one that promises to have a strong influence on the future of the mine. In the last yearly report mention was made of the discovery of payable ore at 750-ft. level, and also suggested possibilities of copper being found in the ore in payable quantities. This anticipation has been realized, the explorations which were conducted to the west of the present workings resulting in the discovery of gold-copper ore covering an area of about two acres and of an average of 8 dwt. of gold and 3.5 per cent copper. The orebody has so far only been tested laterally, and prospecting in a vertical direction will have to be carried on to determine the depth of the discovery. This has, up to the present, been impracticable, as it will first of all be necessary to extend drives in a westerly direction to enable the bores to be put down. In all, 3,770 ft. have been drilled at a cost of £4,600. In 1893 the Linda level, 450 ft. from the summit of the mountain, was completed; since that time the total depth the company's operations has attained is 750 ft., which level was opened up a year ago, and the yearly downward average during the past 10 years has consequently been 30 ft. The only workings in the mine below the 750-ft. level consist of the Crown shaft, from which no exploration of any kind has been made.

"The treatment of the gold-copper ore will be undertaken by the small blast furnace, which was intended in the first place as a scavenger to treat by-products, etc., and which is now nearing completion. The capacity of this plant is about 1,000 tons monthly, but it is premature to consider the erection of a large plant until the extent of the copper-bearing body is proved and various metallurgical factors determined.

"During the half-year it has been found necessary to make certain additions and alterations to buildings and plant conducive to efficiency and economy. A new assay office has been built, and the work formerly divided between the assay office and the laboratory will now be confined to the new building. A blast-furnace, in which it is intended to treat the copper ore, is being erected and will be blown in during January. A pyrites burner is being erected with the object of utilizing the sulphur contained in some of the ore, for the manufacture of sulphuric acid, which, if successful, will do away with the necessity for importing sulphur. Copper canals have also been constructed for the precipitation of copper from the waste liquors, and a good recovery is being made from these. It is also intended to install a set of gas producers at the West and Mundic works, which will displace firewood as a fuel, and effect a considerable saving. A small trial, one erected very recently, is giving highly satisfactory results."

'Leader' is an Australian term which is worthy of adoption. Leader is from the Anglo-Saxon *lædan*, to guide, just as lode is from *lad*, a path. A lode is the occurrence of ore which guides or leads a miner.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Sulphur from Anhydrite.—Is there any commercially practicable process for producing sulphuric acid or sulphur from anhydrite? The anhydrite could be secured in large quantities, averaging 97 per cent $CaSO_4$, and at a very low cost.—R. K.

Answer.—It would hardly be possible to utilize anhydrite for the production of sulphur or sulphuric acid on a commercial scale, as the expense of treatment would be out of proportion to the results obtained. Pyrite is much more economical as a basis of acid manufacture, and there are large stores of the mineral in the United States which can be exploited very cheaply. Any indirect process of recovering sulphur from anhydrite could hardly compete with the supplies of native sulphur furnished by Sicily and other countries.

Calcium Carbide.—What is the production of calcium carbide in the United States? How much is imported annually, and from what country? What is the duty on imports? Where can I find a description of the process of manufacturing calcium carbide?—D. D. C.

Answer.—There are no statistics available as to the production of calcium carbide in the United States, although it is safe to say that the output does not vary much from the consumption, which is estimated at about 16,000 tons annually. The imports are probably small, as the present tariff is 25 per cent ad valorem, and manufacturers in this country certainly labor under no relative disadvantage with regard to costs of production. You will find a full description of the manufacture of calcium carbide in the *Mineral Industry*, Vol. VI; details as to markets, technology progress, etc., are given in the later volumes of this publication.

Flow of Water in a Flume.—What flow of water may be expected in a wooden flume of semi-circular cross-section, 4 ft. in diameter, with a drop of 13 ft. to the mile? The catalogues issued by manufacturers of hydraulic mining machinery contain tables showing the flow of water in "open channels," which, I take it, mean ditches; but would not a flume have a larger capacity than a ditch of the same cross-section? I am told that a flume of semi-circular section will carry more water than a square box of the same capacity; if so, what is the gain with a flume of the above dimensions?—A. B.

Answer.—The flow of water in flumes and ditches is a complicated subject, involving the consideration of several variable factors whose value has never been thoroughly investigated. In the case you give, the data are insufficient to calculate the delivery of the flume with more than approximate accuracy. For instance, it is essential to know whether the flume is to be built of rough or planed timber, and whether it will be straight or have one or more curves. However, omitting these considerations, and assuming that the flume is to run full, we may apply a formula given in Longridge's 'Hydraulic Mining,' according to which the flow would be 22 cu. ft. per second. This flow would be considerably greater than in a ditch of the same form, owing to the less friction of the water on the sides of the channel. For the same reason, a semi-circular flume will carry more water than a square flume of the same sectional area. With a flume 4 ft. in diameter, which has an area of cross-section of 6.28 sq. ft., the gain under the given conditions should be about 1 cu. ft. per second.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

RELIANCE OF MINER ON PROMISED REPAIR.—Where evidence tended to show that the pit boss, on being notified that certain of the timbermen in the stope in which a miner was injured were taking weight, not only promised to erect additional supports, but assured the miner that it was perfectly safe for him to remain there and continue his work, such evidence justified an instruction that if the miner called the attention of the boss to the fact that some of the posts were taking weight, and that the boss promised to remedy the defect, and the miner continued to work because of such promise, he did not assume the risk from such defect.—Highland Boy Gold Mining Company v. Pouch (124 *Federal Reporter*, 148); United States Circuit Court of Appeals.

RIGHT TO MAKE SURVEY IN EXAMINATION OF EXTRALATERAL RIGHTS.—Where, in an action to establish extralateral rights, complainant alleged that the vein in controversy dipped beneath the claim of another at an angle varying at various points along the strike from 85° at the extreme west to 30° next the shaft, and after the vein left the territory of complainant's claim it was exposed in three other claims at and below the 1,000-ft. level, the trial court had no right to authorize an inspection of such other claims and a survey of all the underground workings of same, as such inspection should have been limited to such of the workings as generally lay along the strike of the vein as shown by the apex as found in the location of the complainant. But a survey of the surrounding tunnels and drifts necessary to disclose all the facts with reference to the location is authorized under the laws of Montana (Code Civil Procedure, section 1314).—State v. District Court, etc. (73 *Pacific Reporter*, 230); Supreme Court of Montana.

LIEN ON MINING PROPERTY FOR SERVICES OF FOREMAN, ETC.—Under the laws of Idaho (Session Laws, 1885, page 48, section 6), providing that every laborer claiming a lien for services performed in a mine must, within 60 days after the performance of the labor, file for record a claim containing a statement of his demand, the fact that it was not shown that a claimant had ceased to perform his duties at the time of the filing of his claim for lien did not invalidate such claim. A person employed as foreman and watchman of a mine does not perform services of a professional or supervisory character, so as to preclude him from claiming a lien for such services; but the person filing such claim must designate the amount due him on each mine; otherwise his lien will be postponed to other liens, except where the properties are operated as one mine.—Idaho Mining & Milling Company v. Davis (123 *Federal Reporter*, 396); United States Circuit Court of Appeals.

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

Week Ending February 9, 1904.

751,444. PROCESS OF MAKING PIGMENTS.—William J. Armbruster, St. Louis, Mo. A process of subjecting zinc ores to the action of a suitable acid solvent, then precipitating the zinc by means of a soluble compound of barium, and finally treating the resulting solution with sulphuric acid thereby producing a subsequent precipitate of barium sulphate and restoring the composition of the original solvent.

751,468. ARTIFICIAL-FUEL BLOCK AND PROCESS OF PRODUCING SAME.—Melvin W. Cottle, St. Louis, Mo., assignor to Coaleo Fuel Manufacturing Company, St. Louis, Mo. An artificial-fuel block comprising comminuted coal, sawdust, rosin, and glue, intimately mixed with each other and in a solid cohesive mass.

751,478. MINING-MACHINE.—Henry B. Dierdorff, Columbus, Ohio, assignor to Joseph A. Jeffrey, Columbus, Ohio. In a mining-machine, the combination, of the bed, the carriage, the laterally-acting cutters on the carriage, the holding device rigidly connected with the carriage laterally and adapted to be moved toward and from the carriage, and means for moving the holder device at will into and out of engagement with the coal.

751,482. DEEP-WELL PUMP-VALVE.—Joseph H. Duke, Corry, Pa., and John F. Bray, Saltpetre, Ohio. The combination with a deep-well pump-piston or working valve, of a stem depending from the lower end thereof, a screw-threaded nipple on the lower end of said stem, a screw-threaded shoulder above the nipple on said stem, and a rotatable sleeve on said stem having internal screw-threads engaging the screw-threaded shoulder on the stem, and also having notches on its lower end.

751,532. ROCK-BREAKER.—William A. Merralls, San Francisco, Cal. In a rock-breaker, the combination of the frame, the driving-shaft, the crushing-jaw eccentrically mounted at its upper end on said shaft, the bearing-plate engaging the lower end of the crushing-jaw, the crushing-cylinder between which and said jaw the material is fed, the friction-wheel on the shaft of said cylinder, and the sliding wedge engaging said friction-wheel and received in a socket on the frame, said wedge being provided with spring means for normally pressing it in a direction opposite to the operative movement of the cylinder toward the lower end of the jaw.

751,605. PRIMING COMPOSITION.—Max Bielefeldt, Berlin, Germany. A priming composition for detonators and percussion-caps composed of a mixture of trinitro-naphthalene, dinitro-naphthol-sulphonate, sulpho-cyanide of mercury and potassium chlorate, substantially as described.

751,626. WATER-ELEVATING APPARATUS.—Horace L. Frost, Bristol, Tenn. In a water-elevating apparatus, the combination with separate water-chambers and water-passages leading therefrom, of means for leading compressed air to the chambers to force the water therefrom, a controlling-valve for the air, escape-passages leading from the chambers to permit the air escaping therefrom to shift the controlling-valve, escape-valves controlling the escape of air through said escape-passages, and valve-retaining means movable independently of the escape-valves and designed to prevent the opening of the valves by said fluid-pressure within the chambers until the water has dropped to a predetermined level.

751,627. PNEUMATIC BLOWER.—David R. Gardiner, Neepawa, Canada. In a blower, a casing having a discharge chute or opening, an opening at one side thereof for introduction of straw, and an opening at the other side for admission of air, and a rotary fan in said casing having a series of radial main blades and a central series of helically-arranged auxiliary blades at the side adjacent to the latter opening for drawing in air through said opening.

751,645. PNEUMATIC HYDRAULIC SEPARATOR.—Frank W. Hopkins, Denver, Colo., assignor to the Colorado Iron Works Company, Denver, Colo. In combination, a casing having the upper and lower outlets, means for introducing air into the casing extending throughout the entire cross-sectional area of the casing to diffuse the air gently throughout the entire mass of material, said casing being unobstructed for the passage of the material upwardly and downwardly according to weight, an inlet for the crushed material at a point below the surface of the liquid in the casing and a deflector or spreader extending across the inlet to spread the material issuing therefrom and to prevent the escape of the air therethrough, the air-introducing means being located at a distance below the deflector with a liquid-space intervening.

751,648. PROCESS OF TREATING COPPER ORES. Noak V. Hybinette, Plainfield, N. J. A method of treating ores of copper and similar metals, which consists in subjecting the ore in a state of coarse division to an oxidizing roasting and converting the metallic compounds thereby into a more or less soluble condition, then roasting it with a reducing agent, thus rendering said compound insoluble, treating the mixture with water and separating the finely-divided valuable material from the coarser gangue.

751,672. CRUSHING-MACHINE.—James H. McCormick, Beartown, Mont. In a crushing-machine, the combination with the crushing-rolls thereof, of a pair of bell-crank levers on opposite sides of the machine in similar positions, tiltable bearings on corresponding arms of said bell-crank levers adapted to carry one of said rolls, a shaft for each of said bell-cranks journaled in the framework of the machine, an eccentric on arch of said shafts rotatably mounted thereon, said bell-cranks engaging said eccentrics at their elbows, means for revolving said eccentrics independently of each other whereby either end of said roll may be given combined vertical and horizontal adjustment, eccentrics engaged by the other arms of said bell-cranks at their ends, and means for rotating said eccentrics independently of each other whereby said arms of the bell-cranks engaged thereby may be given vertical adjustment independently of each other whereby either end of said roll may be given horizontal adjustment with respect to a stationary roll.

751,698. APPARATUS FOR WOOD DISTILLATION.—John W. Spurlock, Tyty, Ga. An apparatus for distilling wood, comprising a retort, a tar-pipe leading from the lower end of said retort, a vapor-pipe leading from the upper end of said retort, a creosote-discharge pipe leading from said vapor-pipe, a separator connected to said vapor-pipe, a liquid-discharge pipe leading from the bottom of said separator, a series of condenser-pipes forming a circuitous passage, a vapor-discharge pipe leading from the upper end of said separator to said condenser-pipes, a valve-controlled water-discharge pipe tapped into said vapor-discharge pipe below its uppermost point, and a tank or container adapted to receive the discharge of said condenser-pipes.

751,712. PROCESS OF PRODUCING HYDRATED SULPHIDE OF ZINC.—Victor Bermont, Paris, France. A process for the preparation of pure zinc salts from the oxygen-bearing compounds, consisting in treating by ammonia the ore previously crushed and in separating by filtration, after decantation, the solution from the solid part; purifying the ammoniacal liquor produced, consisting in precipitating the metals other than zinc in the condition of insoluble sulphides formed when soluble sulphide is gradually added to the first solution, in separating by filtration, after decantation, these precipitates from the liquid mass so as to obtain as precipitable salts only zinc salts, and in precipitating from this solution perfectly pure salts of zinc by the addition of soluble salt giving an insoluble salt of zinc.

751,720. DISCHARGING DEVICE FOR FURNACES.—Charles I. Dailey, Cleveland, Ohio. In a heating-furnace, the combination with a heating-chamber and means for inserting and advancing a row of billets or other articles to be heated upon a suitable track therein, of an offset in said track forming a hearth located in the hotter end of the heating-chamber for separating by gravity, and holding one or more of said billets from said row, and a sliding extractor provided with a hook-shaped end adapted to draw said separated billet or billets sidewise from said hearth and discharge the same from the furnace.

751,722. NOZZLE FOR IMPACT WATER-WHEELS.—William A. Doble, San Francisco, Cal. A hydraulic apparatus consisting of an impact-wheel with buckets, a nozzle-pipe of sinuous or double curved form for directing a stream of water upon the buckets of said wheel, means for varying the amount of water discharged from said nozzle, and a supply-pipe to which said nozzle-pipe is pivoted on an axis in the plane of its sinuosity, said plane and axis being substantially parallel to the axis of said impact-wheel.

751,733. FEED-TABLE FOR ROLLING-MILLS.—Sigmund V. Huber, Pittsburg, Pa. A feed-table for rolling-mills having in combination means for guiding or directing an article along the table, means for raising and lowering the table, means operative by the table for shifting the guides laterally and means for varying the extent of such lateral movement.

751,753. METHOD OF MAKING PHOSPHORIC ACID.—Nathaniel B. Powter, Brooklyn, N. Y.; Edward H. Fallows, executor of said Powter, deceased. A herein-described process of producing phosphoric acid, which consists in heating phosphate rock within a suitable retort, applying suction to the retort, and collecting the gas evolved.

751,795. ENDLESS CONVEYER FOR PIPE-MILLS.—Charles Jarrett, Dravosburg, Pa. In a device of the character described, a bed or bench, an endless chain traveling in said bed or bench, means for driving said chain, a trough arranged at the side of the bed or bench, and an endless chain traveling in said trough in the opposite direction to the first-mentioned chain.

751,801. METHOD OF ROLLING METAL PLATES.—Arthur J. Maskrey, Martins Ferry, Ohio. A method of producing sheets from a bar of metal which consists in first heating the bar and passing it through a short series of reducing-rolls arranged in tandem, returning the partly-reduced product to a reheating-furnace, reheating the product, passing it through said short series of reducing-rolls a second time in a plurality of thicknesses, opening the pack, matching the sheets thereof together again in a plurality of thicknesses, doubling the pack, returning said pack to a reheating furnace, reheating it, and finishing the sheets in packs by a series of passes through the finishing-rolls.

751,807. EXPLOSIVE.—Heinrich Poetter, Dortmund, Germany. An explosive or blasting substance consisting of the following ingredients intimately mixed in the proportions indicated, 82.7 per cent. of ammonium nitrate, 1 per cent. of dinitrobenzol, 11.625 per cent. of turmeric, 4.8 per cent. of copper oxalate.

751,885. CONVEYER.—Alfred J. Webster, Columbus, Ohio, assignor to Joseph A. Jeffrey, Columbus, Ohio. In a conveyer, the combination of the flights, a chain secured to the flights, the wheels supporting the flights independently of the chain, and the pushing-arms connected to the flights.

751,800. CONVEYER-LOADING DEVICE.—Freeman R. Willson, Jr., Columbus, Ohio, assignor to Joseph A. Jeffrey, Columbus, Ohio. The combination with the hopper or chute, and the series of conveyer buckets or receptacles of the endless carrier interposed between the buckets and the chute and arranged to have its plates form a cut-off floor for the chute upon which rests the material therein, and means actuated by the bucket conveyer for imparting a step-by-step movement to said carrier, its said movement being continuously in one direction.

751,807. METHOD OF DETERMINING THE QUANTITY OF CARBONIC ACID IN GASES.—Guido Bodländer, Brunswick, Germany. A method of measuring by electric potential the amount of carbonic acid contained in gases consisting in passing the gases through a pair of galvanic batteries, one of which is included in the circuit of and opposed to the other, resulting in an electro-motive force, and then measuring said force to determine the amount of carbonic acid.

751,904. HYDRAULIC PRESS FOR MOLDING ARTIFICIAL STONE OR THE LIKE.—Willis H. Fisher, Oklahoma, Okla. The combination of a pressure-cylinder having a plunger with a bed disposed thereon, the cylinder and plunger being located under the center of the bed, a pump operatively connected to the lower end of the cylinder, a foot-treadle for operating the piston of the pump, a mold movably mounted on the bed, an upper pressure-plate, a hand-lever connected to the upper part of the press and having portions depending downwardly and secured to the bed for lowering the latter and the mould thereon, and means for supplying the pump with a pressure medium.

751,911. AMALGAMATOR.—Robert P. Hall, Gem, Idaho. In mechanism of the character described, the combination with separating-screens; of a receptacle thereunder, a series of amalgamating-trays within the receptacle and arranged one above the other, said trays having alternately-arranged outlets in the bottoms thereof, an outlet-pipe extending from the bottom of the receptacle, a water-inlet to the screens, valves within the inlet and outlet, a float for operating the valves, and mechanism for rotating the shaft.

751,919. MINING-MACHINE.—Joseph A. Jeffrey, Columbus, Ohio. In a mining-machine, the combination of the cutter-chain, the carriage supporting said chain, the bed for supporting and guiding the carriage, the power devices for actuating the cutter-chain and moving the carriage, and a holding device for the carriage consisting of an endless chain supported on the carriage and adapted to engage with one of the horizontal walls of the main kerf and to have its active portion moved backward on lines substantially parallel to the path of the carriage while moving bodily forward therewith.

751,925. GRADING, CLASSIFYING, AND DISTRIBUTING AURIFEROUS WASH IN GOLD-SAVING.—Archibald G. Kidston-Hunter, Dunedin, New Zealand. An apparatus comprising an inclined table, a grading-chute disposed at the lower end thereof, a vertically and laterally adjustable grading-board arranged within the chute, a table provided with wells, and means for controlling the passage of the material from the grading-chute to the wells.

751,937. DREDGE.—Ralph R. Osgood, Troy, N. Y. In a dredge or excavator, a hinged boom, a dipper sustained thereon upon a handle arranged to travel back and forth within the bearings on the boom, a hoisting-chain connected with said dipper below the boom and extending above the boom, for operation substantially as described, and a bank-engaging anchor upon the extremity of the boom.

751,941. PROCESS OF MAKING SULPHURIC ANHYDRIDE.—Emile Raynaud, Spy, and Léon Pierron, Jette St. Pierre, Belgium. A process for the manufacture of sulphuric anhydride by means of vehicles of contact of uniform catalytic action consisting in causing the gaseous mixture of sulphurous acid and oxygen at a temperature below the reaction temperature to come in contact, at first with a set of vehicles of contact at a comparatively low temperature, then with another set of vehicles of contact at a higher temperature and lastly with a further set of vehicles of contact again at a lower temperature.

751,955 and 751,956. CLAM-SHELL BUCKET.—John C. Slocum, Columbus, Ohio, assignor to Joseph A. Jeffrey, Columbus, Ohio. The combination of the frame, the two oppositely-arranged scoops or buckets, the principal link or arm for the front of each bucket, the secondary link for each bucket, the heel-link pivoted to the frame and to the secondary link, and the link or bar pivotally connected to the secondary link of one bucket and pivoted to the body of the opposite bucket independently of the principal links.

751,971. ORE-CONCENTRATOR.—Howard S. Bailey and William E. Wild, Denver, Col., assignors to the Mining, Milling, and Machinery Manufacturing Company, Denver, Colo. In an ore-concentrator, a reciprocating table containing a plurality of ore-pulp-receiving recesses of predetermined length, width and depth, a plurality of ridges or dams extending across said ore-pulp-receiving recesses, a plurality of concentrates washing and classifying portions below said dams, means for feeding ore-pulp into and across said recesses, and means for flowing a supply of clear water over the concentrates below said ridges, or dams, and means for tilting and for reciprocating said table.

751,981. PROCESS OF PRESERVING WOOD.—George W. Gordon, Philadelphia, Pa., assignor of two-fifths to Henry Arzt and Julius Sostman, Philadelphia, Pa. A process of preserving wood, consisting in soaking it in a solution of calcium hydroxide and glycerine.

752,016. TIN-PLATE CATCHER.—Ernest L. Cronemeyer, McKeesport, Pa., assignor to American Tin Plate Company, Orange, N. J. A catcher for tinning-machines comprising a pair of positively-driven rollers having gripping portions provided with soft material to prevent marking of the plates.

SPECIAL CORRESPONDENCE.

Denver. February 13.

(From Our Special Correspondent.)

Seven members of the Smeltermen's Union were sentenced on February 6, in the District Court, Denver, to six months in jail and three women were fined $50 each for attacking non-union laborers near the Globe smelter, Denver and resisting the police some weeks ago. The convicted persons are foreigners. The wives of the imprisoned men are endeavoring to induce Governor Peabody to pardon their husbands, as their families need aid and no assistance is forthcoming from the Western Federation of Miners, which practically instigated the strike.

Eighty citizens of Idaho Springs, technically charged with rioting in connection with the deportation of 15 members of the Miners' Union on July 29, were discharged by the District Court, Georgetown, on Feb. 8. Judge De France held that the district attorney who entered a plea of *nolle prosequi*, exercised his discretion under the law. The district attorney's action is approved by practically every citizen of Clear Creek county except the members of the miners' union and their sympathizers.

Officers of the Colorado National Guard have been acquitted at Cripple Creek of falsely imprisoning, in the military guard house, the leaders of the local miners' unions.

Judge Lewis held that the case was not one for the jury and ordered a verdict for the defendants, inasmuch as the National Guard officers executed orders received from the Governor of the State. As a result the Western Federation of Miners has dropped similar cases against military officers, but suits against Peabody will be carried to the State Supreme Court to test his power in declaring martial law and in authorizing the detention and deportation of strikers.

The Attorney General of Colorado has handed down an opinion that the recent disaster at the Stratton's Independence mine might have been averted had certain provisions of the law been enforced and practically laid the blame for the neglect upon the State Commissioner of Mines. The opinion states that the three recommendations made by the committee appointed by the commissioner; the use of some suitable over-winding device; the use of chairs, placed high in the gallows frame to catch the cage, if the cable breaks, and the testing of the safety clutches on cages, by some competent person at regular intervals, are reasonable and can be enforced under the existing law. Governor Peabody instructed the commissioner to enforce the recommendations, and the commissioner has issued the necessary orders, affecting about 150 mines in the State.

The Colorado smelters have again raised the price of treating Aspen ores and concentrates, the advance ranging from 50 to $1.50 per ton.

San Francisco. Feb. 10.

(From Our Special Correspondent.)

Thus far only about half the average amount of snow has fallen in the mountains in the upper part of California, and a much less proportion in the southern part. A recent storm, however, reached from one end of the State to the other, with considerable precipitation even as far south as San Diego. In the mountains of central and northern California the snowfall was quite heavy, but is not likely to last, as the ground was very dry.

William B. Ewing, who organized the Standard Oil Improvement & Investment Co., has been sentenced to the State prison by the United States District Court for 15 months at hard labor. He was convicted of using the mails with intent to defraud. It was a "get rich quick" scheme in which everybody lost money except the promoters. This is the first conviction of the kind for many years, but there are other companies still before the public not one whit better than this one of Ewing's. Some of the gold mining companies now sending out prospectuses continue to take in money on false pretenses by promising dividends which no mining man would expect.

The Trinity *Journal* has done good work by exposing recent statements of the Chonchilula Gold Reef Mines, which issued circulars saying it had decided to defer temporarily dividends, and that it would crosscut the Miner's Dream in Trinity county before spending more money on betterments, the company apparently having moved its operations from California to North Carolina. The *Journal* says most of the work done in Trinity county was surveying claims, a ditch, a line for tramway and locating adjoining claims, the cost being about $200. A liberal estimate of the labor would be 12 men for six weeks. These men put up a prospector's cabin and a cook house. Little or no work was done on the ledge. Some mill timbers were got out and a small mill was shipped to Redding, where it still is. The *Journal* says that the reports, circulars and statements sent out by the company have been grossly inaccurate, as the company never mined nor milled a ton of rock from its 'quarry' and has never been in a position, nor is it now, to pay dividends from the workings of its property in Trinity county.

Manager J. C. Kemp Van Ee, of the Royal Consolidated mines, at Hodson, Calaveras county, has started up his property. The Federation has called the strike off, but Mr. Van Ee has refused to take any of the strikers, saying he had a full crew of non-union men in the mine and was running the 120 stamps of his mill.

The Federation seems to be losing prestige. Mr. Lewis T. Wright, of the Mountain Copper Co., in Shasta county, was the first man to beat it, and Mr. C. B. Jilson, of the Hazel Mining Co., in the same county, the second. The Yellow Aster Co., of Randsburg, Kern county, has its mine and mill filled with non-union men, and the Federation has been unable to coerce Mr. Harpending, of the Union mine in El Dorado county. Thus far it has not been very successful with the big mines except for one or two which had weak-kneed managers. The Royal mine is now negotiating for the erection of a chlorination plant and contemplates using the Merton roasting furnace.

The Folsom Development Co., which has bonded or bought many hundreds of acres of gold-bearing ground in the vicinity of Folsom, has decided to build six dredges. Two of these are approaching completion, and the others are to be provided shortly.

The Du Ponts, of Delaware, New York and Pennsylvania, who recently put Edward G. Lukens, formerly president of the Judson Powder Co., in charge of their powder plants and agencies in California, may soon have a competitor here. A new corporation is being organized with $500,000 to begin with and $1,500,000 finally, which will build a new plant in Contra Costa county, on the bay shore. The plant is expected to be the largest west of the Rockies and will make dynamite, smokeless and black powder, &c. The plants now working on the coast turn out some 40,000,000 lb. of high explosives and 250,000 kegs of black powder yearly, the markets reaching from Alaska to Central America.

Toronto. Feb. 13.

(From Our Special Correspondent.)

At the annual meeting of the Slocan-Cariboo Mining & Development Co. here on February 12, it was decided to issue bonds to the amount of $10,000 to enable work to be continued at the company's gold mines on Canadian creek, near Cariboo, B. C. The money will be partly expended in running a tunnel into the old channel. The report of H. McMaster was to the effect that the claim had been proved to carry gold in paying quantities in two places half a mile apart and that there was good reason to believe that the intervening ground was as rich. It could be economically worked by reason of the limited extent of waste ground having to be worked through to strike the old stream bed. Alfred Ansley was elected president and Charles T. Lyon secretary-treasurer. George H. Weatherhead and W. J. Chick were added to the directorate.

Prof. Rutheford, of McGill University, to whom a specimen of uranium mineral found in an old mica mine near Murray Bay, Charlevoix county, Que., was submitted for analysis by J. Obalski, reports that the mineral contains radium in workable quantity and compares with the best pitch blende used for that purpose in Europe.

The Dominion government has passed an order in council providing that no mining regulations or other regulations for the sale or disposal of government lands shall apply to the 50,000 acres of coal-bearing lands in the Crow's Nest Pass district, which the government obtained in consideration of giving a cash subsidy to the railroad. These lands will only be disposed of as specially authorized by the government.

Preparations are being made by the local committee of the Canadaian Mining Institute for the annual convention opening on March 2. It is expected that Dr. Ledoux, of New York, president of the American Institute of Mining Engineers, will be present, and Lord Minto and Clifford Sifton, Dominion Minister of the Interior, are among the guests invited to the banquet.

Victoria. Feb. 9.

(From Our Special Correspondent.)

The second annual convention of the Provincial Mining Association is to be held in Victoria, beginning Feb. 22.

At the Western Fuel Co.'s Harewood mine, a 7-ft. seam of good steam coal is reported found.

This week shipments commence from the White Bear to the Northport smelter, from the Number One mine to the Granby smelter, and from the Kootenay mine to the Greenwood smelter. The Kootenay has discontinued development pending the conclusion of arrangements for the establishment of reduction works.

Boundary District.—The quantity of ore treated by the Granby and British Columbia Copper Co.'s smelters during 1902 was 401,921 and 162,913 tons respectively. The Granby Co. extracted from ores smelted 16,932,356 lb. of copper, 356,900 oz. of silver, and 47,500 oz. of gold. The company has bonded several copper prospects in Summit Camp. It is said six more furnaces may be added to the plant. The Cariboo mine at Camp McKinney will be closed for the present.

Coast Districts.—It is said operations are shortly to be resumed at the Britannia mine at Howe Sound. On the adjoining Charmer claim ore carrying 2.5% copper was recently encountered.

Nelson District.—The 13,000-ft. aerial tramway, connecting the Hunter mine with the railway at Ymir, being completed, shipments will be maintained, it is expected, at the rate of 100 tons a day.

Northwest Kootenay District.—The second clean-up of the Oyster-Criterion mill at Camborne resulted in the recovery of 200 oz. of gold, valued at approximately $3,000.

Rossland.—Mr. Parrish, manager of the Le Roi, states that 300 ft. west of the main shaft at the 1,350-ft. level a crosscut has been driven 100 ft. along the course of the diamond drilling, and since the ore-body was found drifts have been run 50 ft. in one direction and 30 ft. in the other in ore, which is of first-class grade, averaging from $12 to $20 per ton. Further west in the same level ore of similar grade has been found in another crosscut nearer the shaft. Recent developments at the Velvet have shown that the ore extends into the Portland boundaries. It is proposed to erect a small pyritic smelter at the Velvet mine.

Slocan District.—The Silver-Lead Mines Association is reported endeavoring to induce the Canadian Pacific Railroad to reduce freight rates on lead ores and bullion, the company, according to report, having increased the freight charges. The mill at the Ivanhoe mine is in operation.

Southeast Kootenay District.—The Government agent, reporting on 1903 conditions says that all producing metal mines are closed at present. The pay roll of the Crow's Nest Pass Coal Co. approached $1,800,000 for the year; 1,549 men are employed, besides 287 on construction and in the different offices. The daily capacity of the mines are: Fernie, 1,200 tons; Michel, 1,400 tons; Morrissey, 800 tons.

Yale District.—The Copper King mine, at Cherry Creek, is now shipping regularly two or three carloads a week to the Crofton smelter.

San Luis Potosi. Feb. 9.

(From Our Special Correspondent.)

In Durango the new road from Durango to San Dimas reaches La Borrega. The Guarisa-

mey Gold Mining Co., working the Trinidad, a gold property near San Dimas, is preparing to erect a mill and ship the bullion. The San Dimas Mining & Development Co. has increased its capital from $100,000 to $500,000, Mexican. The Velardeña Smelting Co. is surveying for a railroad from its properties to the Mexican Central at Jimulco. It is said that the Restauradora company, which has a lot of $30 ore blocked out, has had to abandon the cyanide process and will return to pan amalgamation.

The only portland cement company in Mexico, owned by the National Portland Cement Co., at Dublan, Hidalgo, with Joseph Walson president and W. J. Warsat superintendent, is considering the advisability of increasing its capital and plant.

It is stated that George W. Bryant and George M. McIlheney have succeeded in organizing a New York company with $15,000,000, gold, capital to take over and reopen up the Valenciana, Mellado, Cata, Rayas and other belonging to the Rule estate. Included in the plans is a 1,000-ton cyanide plant to treat the old dumps, which run over $5 in gold per ton. Mr. Frank G. Peck, of Colorado Springs, is figuring on a reduction plant for Guanajuato. At San Anton de las Minas, the Dolores Mining & Milling Co. has followed a 3-ft. vein down from the 45-m. level to 115 m., which runs about 800 grams in silver and 10 grams in gold, and is preparing to put in a gravity tram, and start the 10-stamps mill. The Juanita, at the same camp, is also in ore. The once famous Cinco Señores, of San Luis de la Paz, is filling up with water, and the camp is beginning to look abandoned; the other properties seem to be worked out, above water level, and Mexican companies do not like to pump.

The El Oro Consolidated Mining Co. is projected to consolidate numerous companies of El Oro and Tlalpujahua, Mexico, that have ceased operations because of the failure of stockholders to pay the assessment. It is proposed to organize the new company under the laws of Arizona with $1,500,000 capital, divided 300,000 shares of a par value of $5, Mexican.

London. Jan. 30.

(From Our Special Correspondent.)

The Whitaker Wright tragedy has so engrossed public atention that the suicide of Mr. Mordaunt Lawson has been allowed to pass by comparatively nnoticed. Though Mr. Wright and Mr. Lawson perished by their own act through the instrumentality of cyanide, the similarity of the two cases ended there. Mr. Lawson was a young man, son of Sir Wilfred Lawson, the great teetotal advocate. The family is an old and respected one, having extensive estates in Cumberland. Mordaunt, not caring for the idle life of a younger son of a landed proprietor, chose to devote himself to business in connection with ming machinery, mining supplies and metals, and was greatly interested in the development of hematite properties in his native county. At the outset of his career, in 1899, he made very large sums of money by speculating in copper, which at the time was bounding up in price. This success unfortunately turned his head, and he afterward indulged in other speculations without due consideration. He allowed himself to be drawn into the clutches of Mr. Hooley, and became the medium through which very large blocks of promoter's shares in the Siberian gold-fields were worked off on the public. He thoroughly believed in the alleged properties, which had never even been acquird by the company, and which afterward turned out to be quite valueless. So great was his belief that he made himself personally liable for the capital subscribed through his influence and instrumentality. When the worthlessness of the shares he had sold became apparent, he was, of course, overwhelmed completely, was adjudicated bankrupt, and became a broken man. That his burden of life was too great to bear, may be readily conceived. His case is another example of the danger of embarking in business without the necessary training and qualifications. However upright the character, and however successful in other walks in life, such people as the Marquis of Dufferin and Mr. Mordaunt Lawson are sure to fall the prey of the unscrupulous promoter.

During the past year or two I have several times referred to the sale of adulterated washing soda crystals in this country by continental firms. In most cases the adulterant is sulphate of soda, and its presence is explained by the fact that the soda ash process has been incompletely conducted. The most glaring case of adulteration yet recorded was exposed last week by Brunner, Mond & Co., who brought an action for damages against a man of the name of Burgoyne, who had been selling German soda in packages marked B. M. & Co. The buyers of this stuff, on finding its real nature, had complained to Brunner, Mond & Co., who soon discovered the real state of things. On analysis the soda was found to contain less than 10% of soda crystals, the 90% being al sulphate of soda. Adulteration of everything is carried to such a pitch nowadays under the euphemistic name of "trade substitutes" and "trade nomenclature," that the public will shortly ask far a law under which everything shall be sold by analysis.

The Exploration Co., Ltd., is about to take an important step in cutting itself loose from the unrealizable assets with which it is hampered, and so to enable it to get back to its old position more effectively. It will be remembered that after the days of the late Hamilton Smith, and before Mr. R. T. Bayliss came to its rescue, the Exploration Co. strayed from its original business, and embarked in many hazardous industrial schemes which brought it to the verge of ruin. By dint of much hard work and strenuous effort Mr. Bayliss retrieved its fortunes, and placed its finances on a sound basis. The various investments were, as far as possible, realized and loans called in, and the unrealizable investments written down drastically. The further step now contemplated is to split the company into two independent parts, one, to be called the Exploration Assets Co., to take over the troublesome industrial assets, and the other, to be called the New Exploration Co., to take over the various mining interests of the company. It will thus be seen that the New Exploration Co. can henceforth devote itself to legitimate mining enterprises, freed from the legacies of the want of judgment of former managers. It will be possible also to resume the payment of dividends, for it must be remembered that during the past few years, although the legitimate mining operations of the company had yielded substantial profits, yet these were more than wiped out by the serious depreciation in the value of the industrial shares held by the company. The capital of the present Exploration Co. is £1,250,000. The capital of the New Exploration Co. will be £750,000 in £1 shares, while that of the Assets Co. will be £1,000 in shares and £500,000 debentures. The share capital of the "New" and the debentures of the "Assets" will be distributed *pro rata* among the present shareholders, and the directorate and management of the two companies will be identical. The debentures in the Assets Co. will not bear interest, and the only business of that company will be to gradually realize its assets as opportunity offers. Your readers will, I am sure, wish the New Exploration Co., a full measure of success.

Johannesburg. Jan. 18.

(From Our Special Correspondent.)

Many married men, especially artisans, are sending their families to the old country, on account of present economic conditions. The majority of these brought their families out after peace was declared, believing that the cost of living would be less under the British administration. But rents have risen greatly, and cost of living is as high as ever. A married man with a family cannot live comfortably on the Rand just now for much less than £30 per month. So there is little chance of saving for a rainy day. But £7 per month will keep an average family of the artisan class in decency in England, while the miner can live on £12 a month. He is thus able to save £11 out of his £30, if his family lives in Europe. A single artisan, living off the mine, can get quarters for £3 10s. per month, whereas £10 would not secure a pretentious home for a family living off the mine. The rates prevailing on the mines at present are about 10s. per month for a single room, and £4 for a cottage. But the supply of accommodation on the mines does not meet the demand.

The problem for the statesmen of South Africa is to help reduce the cost of living. In Johannesburg, for instance, the problem of high rents can best be solved by having a good electric tram service, so that people could easily and quickly get into the center of the town from distant suburbs. At present the transportation facilities are a disgrace to a city as large and as wealthy, and a start has not yet been made on the construction of the electric trams.

This is the height of the typhoid fever season, but the number of cases appears much less than in former years. The board of health has taken great pains to instruct the public how to escape typhoid or enteric fever, and has distributed concise rules and regulations. It is to be hoped that when the winter scourge, pneumonia, comes, the medical men will be able to keep down the death rate.

Mention was made in these columns some time ago of the importation of 90 miners from the Simplon tunnel in Italy, which caused some friction and threats of a strike. The miners who talked strike now realize they acted foolishly, for the Italians have made, on the whole, a poor showing. The strata cut by the Simplon tunnel are probably soft, and blasted easily compared with the Rand quartzite. The Italians were guaranteed £1 per shift to come out, fortunately for them, for very few of them would make that on contract prices. On the Central Rand, the rocks are harder to drill, and break less readily than on either the eastern or western sections. LANE CARTER.

Perth. Jan. 7.

(From Our Special Correspondent.)

Kookynie.—The Cosmopolitan, under the management of Mr. Shipway, is doing well. The company has established a record in working costs, having reduced these to 17s. 6d. ($4.08) per ton. At the Mertons Reward steady work is being done in development.

Laverton.—Messrs. Bewick, Moreing & Co., who purchased the Lancefield mine for £50,000, have secured the new 40-head mill and other plant from the Guro mines, to be removed to the Lancefield.

Kalgoorlie.—The Great Boulder is increasing its ore reserves, and the value and size of the main ore bodies at depth promise even better. The present estimated value of reserves is about £1,500,000. The Golden Horseshoe, which has been the leading producer for some time, has been opened up to 1,100 ft. vertical; it is intended to continue sinking steadily. Immense reserves of high grade ore are in sight, which warrants the contemplated increase of the crushing plant to 150 stamps. The Great Boulder Perseverance has proved its main ore bodies to the 1,100-ft. level. The Ivanhoe has spent over £40,000 during the past year on new machinery and its additions will shortly be completed. The Associated is pushing development work at the north end, and has proved a splendid body of ore at the 1,000-ft. level. At the Lake View Consols, considerable additions to the plans are decided on.

Western Australia.—The gold yield for December was 202,070 oz. and the total for the year 2,436,310 oz., an increase on the 1902 yield of 258,869 oz. The additions and alterations now in progress at the Kalgoorlie mines should very largely increase the output.

Northern Fields.—These are gradually being exploited. At Polack Range, Hack's lease has been sold for £10,000 to Melbourne people. Green's lease is under offer to a syndicate. The shaft is down 46 ft.; the quartz shows gold freely and is 8 ft. wide. Peak Hill is looking well. At Day Dawn the Great Fingall looks well as ever. The Rubicon has crushed 227 tons for 150 oz. Tailings assaying about 3 dwts. The main shaft is down 375 ft. The Arrino Copper Mine is taking out 20% ore, it being separated for shipment to Swansea, while poorer ore is slacked for treatment by the smelting and lixiviation works to be erected by the Mount Lyell Company.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of the ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL, and making this office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

TO ENGINEERS VISITING LONDON.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers nonresident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution, and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mining and metallurgical engineers are invited to keep the Engineering and Mining Journal informed of their movements and appointments.

Mr. Jas. Douglas has gone to Bisbee, Arizona.

Mr. Frank Klepetko left for Cerro de Pasco, Peru, on February 16.

Mr. J. Parke Channing has returned to New York from Tennessee.

Mr. E. G. Spilsbury returned to New York from Mexico on February 16.

Mr. A. C. Beatty has returned to Denver and will shortly proceed to Mexico.

Mr. Edgar A. Ashcroft returned to London by the *Celtic* sailing on February 17.

Mr. F. C. Roberts, lately in Rhodesia, leaves London for New York on February 20.

Mr. John A. Church is now in New York after several months' absence in Arizona.

Mr. E. Barton Hack, of Denver, has been in New York on his way to Bridgeport, Conn.

Mr. R. S. McCaffery, of Salt Lake City, is visiting New York on professional business.

Mr. F. O. Harvey left London on February 12 on a professional visit to Spain and Portugal.

Mr. H. Kilburn Scott has returned from the Caucasus and India and will shortly leave for Brazil.

Mr. Frederick W. Hoar, superintendent of the Old Dominion mine in Arizona, has resigned.

Dr. James Douglas has gone to Arizona and will not return to New York until the first of March.

Mr. Geo. J. Bancroft has returned to Denver after several weeks spent in New York and Boston.

Mr. Ernest Levy has been appointed assistant manager at the Le Roi No. 2 mine, at Rossland, B. C.

Mr. Nestor A. Young has opened an office as consulting mining engineer at Los Angeles, California.

Mr. C. T. Mixer, manager of the Creole mine at Park City, Utah, has returned from a trip to New York.

Mr. Hans Knutsen, of Kalgoorlie, is investigating cyanide methods in Colorado, and is now at Denver.

Mr. John Fox sailed by the *Anchoria* on February 13 en route to the Akrokerri mines in West Africa.

Mr. Jens Lund, of London, arrived by the *Celtic* on February 12, and left the next day for Medellin, Colombia.

Mr. J. F. Brandes, of Denver, Colo., will start for Europe next week, and expects to remain abroad for some time.

Mr. C. J. Price is acting as consulting engineer to the Ecksteins, a large South African financial and mining concern.

Mr. Walter Harvey Weed will deliver a course of lectures on ore deposits at Columbia University beginning February 15.

Mr. John J. Case has resigned as superintendent of the Tamarack-Osceola smelter, near Houghton, Mich., effective May 1.

Mr. W. T. Murray, is now assistant superintendent at the New England-Clifton Consolidated mines, near Clifton, Arizona.

Mr. George Ridgeway has been appointed manager of the Princess Royal mining property, at Norseman, Western Australia.

Mr. J. H. Brownlee has accepted the management of the Mt. Sicker and Brenton mines on Vancouver island, British Columbia.

Mr. J. Dudley is superintendent of the Eureka Mining Co., at Santa Eulalia, Chihuahua, Mex., succeeding Mr. H. Anderson.

Mr. Walter Dwyer, formerly foreman of the Columbus Consolidated, has been appointed superintendent of the South Columbia at Alta, Utah.

Mr. T. B. Beadle has resigned as superintendent of the Gold Reef Mining Co.'s cyanide plant at Gilt Edge, Mont., and has gone to Sonora, Mexico.

Mr. John J. Daly, president of the Daly-Judge Mining Co., of Utah, attended the annual meeting of that corporation in Jersey City, N. J., on February 16.

Mr. G. H. Robinson, manager of the Tintic Mining & Development Co., of Bingham, Utah, is about on crutches after being confined some time with a broken leg.

Mr. John McGeorge, consulting engineer of the Wellman-Seaver-Morgan Co., has resigned, to take effect March 1, and will open an engineering office at Cleveland.

Mr. Frank Keith has resigned as superintendent of the De La Mar properties in Nevada to accept an appointment on the staff of Mr. John Hays Hammond.

Mr. C. M. Schwerin has resigned his position with the Griffin Wheel Co., at St. Paul, and is now metallurgist for the Milwaukee Coke & Gas Co., with office in Chicago.

Mr. Frank P. Swindler has been appointed superintendent of the Bamberger-De Lamar mines at De Lamar, Nev. He was superintendent under Capt. J. R. De Lamar.

Mr. Joseph Hyde Pratt, of the Engineering Co. of America, has been engaged to make an examination upon the properties of the Globe-Boston Copper Mining Co., near Globe, Arizona.

Mr. Donald R. Morgan, general superintendent of mines for the Compania Metallurgica de Torreon, of Torreon, Coahuila, Mex., expects to spend the latter part of February in San Francisco, California.

Mr. George S. Ashworth, general superintendent of construction of the Tennessee Coal, Iron & Railroad Co., has resigned, effective March 1. He will be general sales agent of the Hardie-Tynes Machine & Foundry Co., with headquarters at Birmingham, Alabama.

Mr. D. H. Newland, on the editorial staff of this JOURNAL, will start shortly upon a tour of the Southwest, including the chief copper mining districts. Our engineering friends will confer a favor by affording him reasonable facilities to acquire correct information.

Mr. E. R. Fairbault, of the Dominion Geological Survey, has returned to Ottawa from a visit to Nova Scotia, where he attended the annual meeting of the Provincial Mining Society at Halifax, having been invited to give them the results of a lengthened study of the gold-bearing formations of the Province.

Mr. Putnam A. Bates, assistant secretary and sales manager of the Crocker-Wheeler Co., announces that he has resigned and will retire from that company on March 1. Mr. Bates has formed a partnership with Mr. John Neilson, who was until recently assistant secretary and assistant treasurer of the New York & Stamford Electric Railway, and under the firm name of Bates & Neilson, will conduct a general practice of consulting electrical engineering, with offices in New York City.

OBITUARY.

Charles Emerson Beecher, head of the department of geology and palæontology at Yale University, died at New Haven on February 15. Prof. Beecher had been associated with the late Othniel C. Marsh in his work at the Peabody Museum at Yale, and was appointed Prof. Marsh's successor. He had merely begun the classification of the great amount of material collected by the latter. Prof. Beecher's best known work was on trilobites, he having determined the existence of appendages used for crawling or swimming.

Marcus A. Hanna, United States Senator from Ohio, who died of typhoid fever at Washington, D. C., on February 15, was for many years a figure in the coal and iron trade. Senator Hanna was born at New Lisbon, O., September 24, 1837, and was, consequently, 67 years old at his death. He had a common school education, with one term in the Western Reserve College, and then became a clerk in his father's grocery store. After his father's death in 1862 he took charge of the business. In 1867 he entered the coal and iron firm of D. P. Rhodes & Co., of Cleveland. In 1877 the name of the firm was changed to M. A. Hanna & Co., which it still remains. Originally the Rhodes firm simply dealt in iron and coal, but Mr. Hanna bought iron mines in Michigan, organized a fleet of lake vesels, built ore docks and blast furnaces, and then bought coal mines and a railroad to carry coal from the mines to the furnaces. These enterprises were operated by independent companies. At the time of his death he was a heavy stockholder in the Pittsburg Coal Co. and had large holdings of coal land in Ohio, besides owning interests in iron mines in Michigan and Minnesota. Aside from his business and political interests, Senator Hanna achieved prominence from his influence in organizing the Civic Federation, a body that aimed to settle disputes between employers and employees by conciliation and arbitration .

SOCIETIES AND TECHNICAL SCHOOLS.

COLORADO SCIENTIFIC SOCIETY.—A well- attended meeting was held on February 6, Mr. Harry A. Lee presiding. The main subject of the evening was an informal discussion on radium. The society has arranged with Dr. W. J. Hammer, of New York, to deliver a lecture on this subject in Denver on February 26.

ENGINEERS' CLUB OF PHILADELPHIA.—At the meeting on February 6 there were 102 members and visitors present. Mr. John M. Hartman presented a paper on "Burning Bituminous Coal," in which he discussed hand stoking, the construction of furnaces and some types of mechanical stokers. He quoted from a report on the use of stokers in Cleveland and Pittsburg and the resulting diminution in black smoke.

MONTANA SOCIETY OF ENGINEERS.—The annual meeting was held at Helena, January 8 and 9. A trip was taken on January 8 to the electric power plant, at Cañon Ferry, about 18 miles from Helena, where the engineers were welcomed by Mr. M. H. Gerry, Jr., and his assistants. In the evening the engineers and their friends were the guests of President Wickes at a "smoker." At the business meeting on January 9, Mr. George M. Craven was elected a member. The following officers were elected: George E. Moulthrop, president, Butte; Ernest W. King, first vice-president, Bozeman; Malcolm L. MacDonald, second vice-president, Butte; Clinton H. Moore, secretary and librarian, Butte; Samuel Barker, Jr., Butte, treasurer and member of the board of managers of the Association of Engineering Societies; Charles H. Repath, Edward L. Blossom, Charles H. Bowman, trustees. The president's annual address had for its subject, "Early Surveying Reminiscences in the West." and the discussion of various subjects, chiefly the works of Montana engineers during the past year.

INDUSTRIAL.

Adam Cook's Sons, of New York City, report the receipt of testimonial letters testifying to the excellence of Albany grease as a lubricant for all kinds of machinery.

The Corinth Engine & Boiler Works, Corinth, Miss., recently incorporated, is reported to be preparing to install a complete equipment within 60 days and is considering electricity for power.

Owing to the recent fire, the Baltimore office of the Westinghouse Electric & Manufacturing Co. has been compelled to move to temporary quarters at 221 North Calvert street, Baltimore, Md.

Leahy Bros., of Los Angeles, Cal., manufacturing crude oil burners, report that the Santa Fe railway has just completed a test of 28 burners for its locomotives, and that the results favored the L. K. L. burner made by Leahy Bros.

The Westinghouse Machine Co., of Pittsburg, Pa., has received an order for a $300,000 steam turbine equipment at the Government navy yard at Charlestown, Mass., of 1,000 h. p. capacity. Three more orders of the same size are expected to follow the completion of this one. Pumps for a new dry dock to discharge 65,000 gal. of water a minute will be run by a 500 h. p. Westinghouse motor.

The National Lime Manufacturers' Association of the United States, at its recent session in Pittsburg, elected these officers: A. Newton, Chicago, president; Peter Martin, Huntingdon, first vice-president; W. B. Hill, Kansas City, second vice-president; Charles Warner, Wilmington, Del., third vice-president; H. E. H. Defebaugh, Louisville, secretary; C. W. S. Cobb, St. Louis, treasurer.

The M. Garland Co., Bay City, Mich., reports the following shipments: To the National Lumber Manufacturing Co., of Smithfield, W. Va., a Garland spring tension band mill, log carriage and steam feed, two sets of rip and cut-off table to the Kelly Lumber Co., Traverse City, Mich. A shipment of self-oiling boxes and shafting to Cleveland-Sarnia Saw Mill Co., Sarnia, Ont. One Garland clutch pulley to Rose City Manufacturing Co., Rose City, Mich.

Another set of bids will be invited for the construction of the foundry and power house at Newark, N. J., of the Lidgerwood Manufacturing Co., New York. No orders for equipment have been placed as yet. The foundry building will be 120 by 600 ft., and have a capacity of about 75 tons daily. The power station, which is to be eventually equipped with about 1,000 h. p. of generating apparatus, is to have one 250 h. p. unit for operation of the foundry. The building will be 40 by 225.

The Pickands-Magee Coke Co., of Pittsburg, organized last July by W. C. Magee, formerly vice-president of the H. C. Frick Coke Co., and Pickands, Brown & Co., of Chicago, has admitted to its corporation Pickands, Mather & Co., of Cleveland, O. The coke company will represent the Pickands-Magee Coke Co. throughout northern Ohio, Pennsylvania and New York as Pickands, Brown & Co. represent the company in the West. The company simply handles the output of smaller operators in the Connellsville region, which was formerly marketed by the H. C. Frick Coke Co.

The Allis-Chalmers Co. is to manufacture heavy electrical apparatus. It is not intended that there shall be any increase in stock to provide the funds for this departure, as some of the plants made unnecessary by the completion of the big $3,000,000 plant at West Allis, near Milwaukee, Wis., will be utilized. The company has secured a steam turbine patent, and will make steam turbine engines. It is stated that the electrical part of the plant will be under the supervision of John F. Kelley and William Stanley, Jr., both of whom have been connected with the Stanley Electric Company.

Work preliminary to the development of the Cerro de Pasco copper mines in Peru, South America, recently acquired by the Haggin-Vanderbilt syndicate, is being carried out under Frank Klepetko, consulting engineer, of New York. The William B. Pollock Co., Youngstown, O., has the contract for the steel plate construction parts of the smelter, including steel chimneys, furnace flues, dust chambers, and a large amount of piping. One chimney is 37 ft. 7 in. at the bottom, 23 ft. 6 in. at the top inside dimensions, and 200 ft. high, the other 22 ft. 6 in. at the bottom, 14 ft. 4 in. at the top and 180 ft. high.

The Goubert Manufacturing Co., of New York, is to erect a new plant on the water front at Bayonne, N. J., for the manufacture of feed water heaters, steam separators and also for producing large engine castings and marine engine work. There will be four foundry buildings, one 70 by 310 ft., and three, each 60 by 310 ft., with a capacity of about 50 tons a day at the outset, employing four cupolas. The large building will contain a 40 and a 25-ton electric traveling crane, and each of the others a 25-ton traveler. The machine shop will be 90 by 400 ft. and the equipment operated by individual motors. An industrial railway will be installed and a 300-h. p. engine with water-tube boilers, equipped with superheaters, will furnish the power.

P. H. Wilhelm, formerly representing the New York Car Coupler Co., the Washburn Car Coupler Co., the Buckeye Malleable Iron & Coupler Co., and the Railroad Supply Co., of Chicago, with headquarters at Atlanta, Ga., has accepted a position as railroad representative of the American Steam Gauge & Valve Manufacturing Co., Boston, Mass., with branch offices at New York, Chicago, Philadelphia, and Atlanta, Ga. Mr. Wilhelm, who has spent many years in actual railroad service, was division superintendent of transportation at the World's Fair in Chicago, and after the close of the exposition took up the active business of railroad supplies, which he has since followed. The American Steam Gauge & Valve Manufacturing Co. states that it now has the largest plant in this country devoted to the manufacture of steam and other gauges, safety valves, steam engine indicators, whistles and steam supplies in general.

The Power & Mining Machinery Co., of Cudahy, Wis., has contracts with the International Steam Pump Co., of New York City, for installation at the new plant at Harrison, N. J., of two 11 ft. by 16 ft. Loomis-Pettibone gas generators, together with two 10,000 cu. ft. holders. This plant is to be used for metallurgical work. The Nogales Copper Co., of Chicago, is to install in Mexico three Crossley high-speed double-cylinder gas engines, 330 brake h.p. each, with cylinders 25 in. by 30 in., and one Crossley high-speed single-cylinder gas engine, with cylinder 18½ in. by 27 in.; four 9 ft. by 15 ft. Loomis-Pettibone gas generators, one 10,000-cu. ft. holder and one 5,000-cu. ft. holder. This contract also includes the mining machinery for the plant. Sayles' bleacheries, of Saylesville, R. I., will install one 255 brake h. p. two-cylinder 22 in. by 30 in. high-speed gas engine. The water gas, generated by the Loomis-Pettibone system is used for heating the singeing machinery and the producer gas in the gas engines. The new engine is to run in parallel with another gas engine which has been running at the Sayles' bleacheries for over a year.

TRADE CATALOGUES.

Grab buckets are treated of in pamphlet No. 77, issued by the Jeffrey Manufacturing Co., of Columbus, O.

"Gears" is the subject of a well-bound volume which the H. W. Caldwell & Son Co., of Chicago, Ill., issues. The volume contains hints on the selection of gears, and many valuable tables.

"Twist Drills, Their Uses and Abuses" is the title of a neat little catalogue published by the Cleveland Twist Drill Co., of Cleveland, O., for the benefit of those using twist drills, reamers, taps, cutters, etc.

The Polytechnic Business College Journal, a publication devoted to the interests of business education, is issued quarterly at Oakland, Cal. It points out a way to the man or woman seeking such education. A copy will be sent by the publishers on request.

Queen & Co., Inc., of Philadelphia, Pa., have issued a booklet which is a summary of the work and materials put out by its various departments, which embrace optical, mathematical and engineering, microscopical, physical and electrical instruments and supplies.

Users of hot metal cars, cinder cars and ladles will find of value a catalogue now being sent out by the Wm. B. Pollock Co., of Youngstown, O., builders of steel plate construction for blast furnaces, etc. Illustrations which show ladles up to 60 tons capacity are supplemented by brief descriptions.

The second edition of catalogue No. 115, the general condensed catalogue of the B. F. Sturtevant Co., of Boston, Mass., is ready for distribution. This catalogue describes and illustrates a number of new apparatus manufactured by the company, among which are a new type of hand-blower; several new types and sizes of forges; new sizes of vertical single and double engines; a new type of enclosed vertical compound engines; new type of semi-enclosed bi-polar and 4-pole motors; new sizes of generating sets with vertical compound engines; factory equipments, such as bench-legs, pattern storage shelf brackets, electric hoists, cast iron sinks, trench cover-plates, etc.; industrial railway equipments, such as cars, truck ladles, turn-tables, T-rails, etc. It also contains a description of the various Sturtevant systems, such as heating and ventilating, special ventilating, drying, conveying and mechanical draft systems.

GENERAL MINING NEWS.

ALABAMA.

JEFFERSON COUNTY.

(From Our Special Correspondent.)

Active development is progressing on coal lands in the western part of this county along the line of the new North Alabama branch of the Louisville & Nashville road. At Mineral Springs openings have already been made, which are producing nearly 3,000 tons of coal daily, and no less than 30 other openings are being made along the line. The Sayre Mining & Manufacturing Co., which is developing the coal property, has recently let a contract to J. M. Meighan to build 100 coke ovens, and it is understood that 200 more will be started as soon as the first block is well under way.

ARIZONA.

(From Our Special Correspondent.)

Diamond Drill Work.—Wolverine & Arizona exploration has purchased a diamond drill for immediate exploration. Portage, Lake & Bisbee, another Michigan company in this district, is to install a drill as soon as possible. Marquette & Arizona, which has claims on the flat some miles south of Bisbee, will also put in a drill. Houghton Development Co. already has one at work and drills are on the way for the Calumet & Bisbee and Calumet & Cochise. The work at Junction Development has stopped for the present.

COCHISE COUNTY.

Wolverine & Arizona.—Sinking continues at Bisbee; the shaft is down 580 ft. A complete diamond drill outfit and a Prescott mine pump, capacity 500 gal. per minute, have been ordered. The following machinery is in place. A 12 by 14 single drum hoisting engine; a 6 by 8 hoisting engine; three boilers, 110 h. p.; a 16 by 24 six-drill air compressor, and a No. 9 and a No. 7 Cameron sinking pump.

GRAHAM COUNTY.

Arizona Copper Co.—The production of copper for January was equivalent to 1,317 tons of 2,000 lbs. each.

CALIFORNIA.

AMADOR COUNTY.

Near Oleta the Suckertown is bonded and being worked by Clark Bros. and Thos. Mahon. A steam hoist has been put in and a sump is being made in the 90 ft. incline. Jackson and Jenkins have leased the Croff mine and are working it. A hydraulic mining plant has been put in on Teldthusen's claim and another on the McKee mine. There are negotiations pend-

ing for a sale of the Cooper quartz mine a mile from Oleta.

Argonaut Mining Co.—While the new levels are being opened at this mine, Jackson, the shaft will be sunk another 200 ft.

Central Eureka.—A contract has been let at this mine, Sutter Creek, W. R. Thomas, superintendent, to sink the shaft 100 ft. deeper.

CALAVERAS COUNTY.

Chris. Anderson.—This mine near San Andreas has been bonded by F. J. Juchter, and suitable pumps will be put upon it. The mine lies in the Central hill gravel channel.

Garibaldi.—Work has been resumed on this mine near San Andreas.

Gertrude Mining Co.—This company has been organized to work the Demarest mine near Fourth Crossing. The improvements consist of a new 5-stamp mill, hoists, engines and other machinery; the shaft on the mine is down 650 ft. The principal place of business is Angels and the officers are Dr. J. R. Darroh, president; Wm. Morehead, vice-president and manager, and A. G. Madson, secretary.

Jones.—This mine has been bonded to J. Cameron and Thos. Kerns, of Spokane, Wash., who are clearing out the ditch and repairing the 40-stamp mill.

Royal Consolidated.—The Western Federation has declared the strike off at this mine at Hodson, but it already has a full crew of non-union men at work.

San Domingo.—A new Krogh mill is being placed at this mine.

KERN COUNTY.

The only placer mine in the White River region is on the Wooley property bonded and leased by John McKiernan, of Springville, at the head of Coarse gulch. There are 40 acres in the tract on which some little work has been done. The water for washing will be raised 117 ft. by a large water wheel and two force pumps. The work is now going on.

NEVADA COUNTY.

California Mining & Development Co.—This company, operating at Grizzly Ridge, Peter McAusland superintendent, is opening up six claims. Over 400 ft. of tunnels have recently been run and sinking has commenced in the claim where the best rock was found.

Elsie A.—The ore bins at this mine have been finished and the mill is running.

Ethel.—In this mine near Washington, a 16 in. ledge assaying $40 per ton, has been encountered in the tunnel 900 ft. from the mouth, and about 300 ft. from the surface.

Idaho Development Co.—This company, John E. Carter, manager, has abandoned the bond on the South Idaho mine, and is working the Gambler. Several other claims near by have been taken up and are being patented.

Murchie Mining Co.—The new six-stamp Merrals mill at this mine, Nevada City, has been started up. The tram from mine to mill has been completed and the new water system has been finished. Ore is being broken down on four levels.

New Eureka.—The drain tunnel has been completed at this mine on Canada hill, and the incline is now being sunk.

Round Mountain.—This mine, Nevada City, has been bonded by Robert Huckins, Alfred Scrivens and others, and small hoisting works are to be put up.

Sunflower.—An 8-ft. vein is reported in the bottom of the shaft of this mine.

RIVERSIDE COUNTY.

Good Hope.—This mine at Perris has again been sold by the sheriff on judgment against H. B. Johnson. Hook Bros. were the buyers.

SACRAMENTO COUNTY.

Syndicate Mining Co.—This company has bought the C. A. Nuttall place, and at Dredge, two miles west of Folsom, machine shops and dwellings for employees are erected. C. R. Macken is superintendent. The company has had seven prospecting drills working all winter testing the ground.

SAN BERNARDINO COUNTY.

The new 40-mile road from Amboy on the Santa Fe railroad, to Dale, has been finished.

Colorado River Gold & Copper Co.—This company at Echo Bend near the Colorado river, is arranging a reduction plant. Wm. Field is manager.

Ivanhoe.—At this mine, Dale, a 30-ton cyanide plant is being put in.

Seal of Gold.—This company at Dale is excavating preparatory to putting in a 10-stamp mill and cyanide plant.

Supply.—This mine near Dale is being operated by the Co-operative Mining Co., and has put in a new 60-ton cyanide plant. About 40 Armenians are working in the mine.

SAN DIEGO COUNTY.

Stonewall.—Col. S. H. Lucas reports that this mine at Cuyamaca will be amply financed shortly, and work will go on upon a more extensive scale.

SHASTA COUNTY.

Over 20 heavy freight teams are hauling ore to the Keswick smelter from the Shasta section and 15 are hauling from the Quartz hill district.

Afterthought.—At this copper property, owned by the Great Western Gold Co., 50 men are now employed. The smelter building has been finished and the furnace set in place. The large electric motor is being installed.

SIERRA COUNTY.

Alleghany Mining Co.—The general manager of this company, J. W. Morrell, has bought the Telegraph and Telegraph Extension claims of 160 acres and the Empire claim of 100 acres. The company now owns 1,110 acres in a continuous strip along the Keystone, Red and Blue Lead channels. A body of gravel which prospects well has been found in the Red channel and a bedrock tunnel through which to sluice is being driven.

SISKIYOU COUNTY.

The dredger on Yreka creek below Hawkinsville and the Blue Gravel mine are to start up again. Edgar Wallace has succeeded in forming a company to start work on both properties.

Mount Vernon.—This group on the Cherry hill divide opened up and developed by Geo. V. Gray, has changed hands and is now under the management of H. D. Lane, of Spokane, Wash.

Wheeler.—This claim in Scott river canyon has been bonded by men from Tacoma, Wash., who intend putting in an extensive steam pumping plant. The pay gravel is about 80 ft. below the surface.

TRINITY COUNTY.

Layman.—At this mine near Hay Fork a quartz mill is being put up.

TUOLUMNE COUNTY.

Black Oak Mining Co.—During the shutdown at this mine, owing to the miners' strike, many improvements have been made. Among other things sorting tables have been put up to sort the smelting and milling ore.

Horseshoe Bend.—The compressor is being installed at this mine and the drills will be running in a few weeks.

Vine Spring Mining Co.—A cyanide plant is being put on this property near Columbia.

YUBA COUNTY.

Honeycomb.—A San Francisco company is now running a tunnel on this property at Camptonville.

COLORADO.

BOULDER COUNTY.

Magnolia Mining & Reduction Co.—This company of Magnolia has elected the following directors: William H. Watrous, president and treasurer, Hartford, Conn., H. G. Talcott, vice-president, Talcottville, Conn.; James W. Cheney, South Manchester, Conn.; H. J. Hersey, of Colorado; David N. Camp, New Britain, Conn.; Horace J. Wickham, Hartford, Conn., and George M. Hersey, Hartford, Conn. The company will do no mining, but will treat gold ores, chiefly by the use of cyanide. John H. Kemp is in charge and W. H. Davis is assayer.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

Fairfield Mining Co.—This company has a capital stock of $500,000. The directors are John W. Smith, H. W. B. Reed, H. C. Kilmer, C. C. Buckman, S. T. Taylor and E. H. Buckingham. The company operates the Fairfield group in Russell district under a lease and bond.

Fleiss.—A group of 23 lode claims in the Enterprise, Pleasant Valley and Lake districts, and owned by Black Hawk men, is reported sold to Tom George, of Denver, who represents eastern capital, the reported consideration being $75,000. Several of the claims have produced high grade silver ores. Gus E. Bolander, Black Hawk, will be superintendent.

Fort Logan.—Denver men have taken a two years' lease and bond for $10,000 on this property, in the South Boulder district.

Old Town.—Grading for the new shaft house at this mine in Russell gulch, near Idaho Springs, is under way, and a new 100-h. p. hoist and an 8-drill compressor, both electrically operated, are to be put in. George Kimball is manager.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

Banker.—The stockholders have $75,000 to carry on development. At the bottom of the shaft there is a fair body of copper sulphide.

Big Chief.—The daily output is 100 tons from the old workings. In early days the mine was a large shipper.

California Gulch.—Work is pushed in the drift running toward the old Carbonate mine. It is believed that the main ore shoot is not far off.

Dunkin.—Lessees are shipping two cars daily of good iron ore from this old property on Fryer hill.

Fitzhugh.—This old property is under lease to Kyle and Estey, who are mining a sulphide that runs 30 to 125 oz., silver to the ton. Occasional rich streaks of chloride are encountered.

Fryer Hill Mines Co.—Shipments of sulphides continue steadily from the El Paso workings. Manager Newell is pushing new work.

Huckleberry.—This St. Kevin property has made its first shipment of silver ore.

New Leadville Home Mining Co.—Little work is going on, but a project is under way to lease to new parties.

Midas-Coronado.—The daily output amounts to 250 tons of good grade iron and sulphides. The Coronado shaft will be sunk 250 ft. deeper.

Nisi Prius.—The new shaft sunk by lessees, is down 180 ft., where a station is being cut, and another 25 ft. will put it into contact. The new shaft is 900 ft. south of the old Weir shaft, and is to open the Rock hill ore shoots. Good bunches of mineral have already been struck in the contact.

Ollie Reed.—This property continues to ship regularly high grade ore, but the exact values cannot be ascertained. Chicago men are interested and dividends are being paid.

Penrose.—Men are pulling out the old water and steam pipes and will soon start retimbering the shaft. A new plant will be put in and the shaft will be sunk 250 ft. deeper.

Ready Cash.—The new workings show a continuation of the vein. Another shipment shows assays as high as 4 oz. gold and 217 oz. silver.

Resurrection Gold Mining Co.—Active development is going on in both shafts and much low-grade sulphide is being opened. This is successfully treated by the magnetic concentrating plant. The mill is temporarily closed on account of a scarcity of water due to the cold, but will start again in about 30 days.

St. Kevin District.—Arrangements are under way for much new work the coming summer. The properties already opened show rich silver ore, and there will be several new producers next month.

Wild Cat.—The new shaft house is about completed.

SAN JUAN COUNTY.

Gold King Consolidated Mines Co.—The Anglo-Saxon tunnel near Silverton is in about 2,500 ft. An air shaft is being made about half way in. Power is supplied by a 50-h. p. gasoline engine. The addition to the company's mill at Gladstone, which is 73 by 67 ft., is enclosed, and by March 10, it is expected the modern slime treatment machinery will be in place. W. Z. Kinney is the manager and about 225 men are employed.

Gold Truce.—The new compressor has been started on these properties near Silverton and about 12 men put to work.

Little Maud.—P. C. Molan and Arthur Rice are prospecting this mine near Silverton, under an $85,000 bond and lease, which includes the adjoining claims on the Little Maud group, owned by Henry Born, et al., and 50% royalty is paid for all ore mined and shipped.

Silver Wing.—This tunnel in Jones' mountain near Silverton is in about 1,700 ft., and was expected to cut the Denver Bell vein at that distance.

Treasury Mining Co.—The 250-ton mill is to be started shortly. On the Hammond tunnel near Red Mountain, 30 men are employed. The Corncob vein cut at 5,000 ft., is reported of good value.

SAN MIGUEL COUNTY.

(*From Our Special Correspondent.*)

Butterfly-Terrible.—The showing at this property at Ophir Loop is more encouraging than ever before. There are about 50 men employed. The steam plant that was installed during the shut down now furnishes power in the mill, and the water supply is used for concentration. Twenty stamps have been steadily dropping since work was resumed in December. Manager Keating is confident of a most successful season's run. The large ore zone opened by the crosscut tunnel is proving considerably richer than the quartz found in the upper levels. If nothing prevents the steady operation of the mill the output this year should exceed the normal.

Nellie.—About 50 men are employed and mine is working steadily. The mill has 20 stamps dropping. About May 1 Cooper Anderson, manager, will increase the working force and start 20 more stamps in the mill. Operations now are going on in only two of the six levels.

SUMMIT COUNTY.

Colorado & Wyoming Co.—The vein in Mineral hill, near Breckenridge is believed to be the extension of the Oro vein. Development continues and the lead-silver ore is marketed to the amount of 55 tons weekly.

Old Union Mining & Milling Co.—This company is to work the old Union and adjoining claims through the Smith shaft on Mineral hill near Breckenridge. A shaft house is near completion and machinery will be installed soon. The shaft is down 100 ft.

Quandary Mountain Mining & Milling Co.—The machinery on this property above Breckenridge is reported under cover, the mill being about ready to work. The Monte Christo lode will be worked by open cuts and in the spring the tramway will be completed to the mill.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

Findley Gold Mining Co.—This property on Bull hill has resumed work. Some time ago the plant was destroyed by fire. The present shaft house is built of brick and the hoist is a large direct connected one. The property has been a steady shipper for some time and is controlled by A. E. Carleton and associates, of Cripple Creek. J. S. Murphy is in charge of the property.

Isabella Gold Mining Co.—At the annual meeting held recently the following directors were elected: E. W. Giddings, G. N. Stone, K. R. Babbitt, J. A. Hayes and J. A. Connel. The stockholders ratified the merging with the Empire State Mines Co. There was considerable opposition from the minority led by James F. Burns, president of the Portland Co. It is understood that the minority will ask for an injunction to prevent the merger. The Isabella Gold Mining Co. will not go out of existence for a while as the property will not be transferred to the new company until the present lease on the property expires. This lease is understood to run about three years. The Empire State property will not be transferred to the new company yet, although the new company controls the stock of both the old companies. The president's report of the Isabella Co. shows that but little work was done on the property during the past year principally on account of the depleted condition of the treasury and the labor troubles.

Orphan Belle.—The McCrea lease on the old Maloney shaft of this property has struck some good ore. This is the extension of the old Maloney shoot that produced so much ore a number of years ago.

W. P. H.—The lessees on this property are still getting out some of the fabulously rich ore that has made the property famous of late. Besides the richest streak which is being extracted by hand a larger quantity of ore of lesser grade is being shipped. Several suits have been filed against the lessees by parties claiming an interest in the lease, but so far they have been of no avail. The strike on this property has stimulated work in the vicinity and a number of other properties are being operated.

IDAHO.

IDAHO COUNTY.

Leroy Mining Co.—The Homestead group near Elk City is reported purchased by this company for $50,000. The Leroy company bought the Leroy property near Elk City last year and has installed a 10-stamp mill. A small mill is to be put up on the Homestake, on which about 800 ft. of tunnels have been run. The company has $1,500,000 capital stock, of which $610,000 in shares have been issued. Mahlon T. Newlon, of Philadelphia, is president; W. B. Riley, treasurer, and W. H. Plummer, secretary and general manager.

Lexington Gold Mining Co.—This new company is to operate the Lexington & Wild Horse groups at Buffalo Hump. The following are the incorporators: C. F. Allen, Clarkston; G. W. Thompson, J. C. Mayes, Columbia, Tenn.; H. Witherspoon, Moscow, Ida.; C. Moore, Grangeville, Ida.; T. B. Bartlett and E. A. Cox, Lewiston.

SHOSHONE COUNTY.

Silver Cliff.—Eleven claims comprise this group, near the Montana line. The ore is said to run high in copper. A 400-ft. upper tunnel was run and a lower one of 1,600 ft. The controlling interest in the property is owned by M. J. Shannon, J. D. Young and E. C. Young.

MINNESOTA.

IRON-MESABI RANGE.

(*From Our Special Correspondent.*)

Mines are hardly looking for orders for the season much before May 1, so no considerable amount will be shipped till well into June; last year the Duluth, Missabe & Northern road shipped some ore to dock about April 15. These differences in dates are a pretty good indication of the difference in conditions. Men in the trade think shipments will be far under those of last year. At present rate of consumption there is enough ore on lower lake docks and at furnaces to keep them going till well into the next winter.

Drilling is underway for a Minneapolis concern, on section 17, T. 58, R. 20, a mile north of the quartzite outcrop that defines the bottom of the iron formation.

Consumers' Ore Co.—Spur tracks from the Great Northern road are to be constructed to the Yates and Frantz mines of this company, in sections 11 and 21, T. 58, R. 19. These two properties are being opened for shipment the coming season by M. A. Hanna & Co., and are their only mines on the Mesabi range.

Corrigan, McKinney & Co.—This firm will do little at its Jordan and Commodore mines this year, and will fill contracts from the Stevenson. It is in the market to sell all the ore it can place from this mine, while the ore body shows larger size and the stripped area is remarkably extended since last spring.

M. A. Hanna & Co.—This company's new Frantz mine is hoisting a little ore from development and should have a moderate stockpile by the opening of navigation. This mine is the only active property at Buhl. It will be equipped for a large production.

Muskeg Mining Co.—This company, composed of Wisconsin men, is drilling in the southwest part of T 59 R 14, and has cut considerable of the characteristic mixed ore and chert of that part of the range. Several drills are working in the same neighborhood for G. G. Hartley and others.

Oliver Iron Mining Co.—No. 2 shaft at Chisholm mine, near Hibbing, has reached ore and some small amounts are hoisted daily from development. The mine is making a good deal of water. It will be developed tributary to No. 2 shaft and will be abandoned.

Pickands, Mather & Co. — This company's only mine in Minnesota now working is the Utica, at Hibbing, which is employing half force. It is under the name of the Crete Iron Co. and is sinking a shaft at the Elizabeth. The shaft is wet and has been in quicksands much of its depth. There are 11,000,000 tons of ore in the Elizabeth, a State lease, and the Great Northern will build in a spur.

St. Clair Explorations.—On lot 6, section 6, T. 58 R. 15, G. A. St. Clair has been working for some months, and has a very fine showing, one hole being in ore over 130 ft. There are said to be over 2,000,000 tons in sight. The ore is of about the same grade as that found on the Daniels-Spellman lands near by. Mr. St. Clair in the east side of lot 12, section 1, T. 58, R. 16, has some of the same ore. This is on the shore of Embarras Lake, and is shown on the maps as a trifle south of the ore bearing formation. The tracts belong to R. H. Palmer, J. T. Hale, Alf Merritt and associates. The exploration is without doubt the most important now under way by any one on the Mesabi range, outside of some work for the United States Steel Corporation at Sparta.

Tesora Mining Co.—This company, operating the Forest mine, west of Hibbing, is hoisting ore in a small way. It would have made small trial shipments last fall had the railway been completed. The company thinks it has better than 1,000,000 tons of bessemer ore. The tract has not bene explored fully yet. The main body of ore was found 6 ft. below the surface.

IRON—VERMILION RANGE.

(*From Our Special Correspondent.*)

Several exploring crews will soon start work on the western extension of the Vermilion range, in towns 59 and 60, ranges 21, 22 and 23. Ore is known there, but its quality has always been believed poor. One drill is working in that district. Another will go into section 14, T, 60, R, 22. A good deal of float ore has been found, a line of strong magnetic attraction has been traced, and some shallow testpitting by the Great Northern railway and others in past years uncovered lean ore and a jasper and ferruginous chert.

Roy Iron Co.—This company has been exploring the Roy lands, in section 1 T. 62, R. 12, and the drill is said to have cut over 100 ft. of excellent ore. The company is interested in other lands near by. The property is about two miles southeast of Ely.

Section 30, T. 63, R. 11.—Permission has been given explorers to locate drills on the Hyde lands, and a drill is now searching for the footwall of the probable ore body. The Hyde land is the property of the Bishop Iron Co., which is a United States Steel concern. Nothing has been decided yet as to the sinking of a test shaft.

Soudan Mines.—Men are repairing and rebuilding compressors at these mines near Tower, but it is not expected the properties will resume work.

MISSOURI.

ST. FRANCIS COUNTY.

(*From Our Special Correspondent.*)

Central.—This mine has again started up after closing because of a second strike. The management decided to close until it could operate the mine without interference from the union, and after a 6-weeks' shutdown, the men were glad to ignore the union and return to work on any terms. No violence or trouble occurred, as no effort was made to operate the

property. It would have remained closed as long as the miners' union attempted to dictate how it should be operated.

MONTANA.

GRANITE COUNTY.

(*From Our Special Correspondent.*)

Henderson Mining Co.—The property, at Sunrise, including the mine and mill, has been sold for taxes by the county treasurer at Philipsburg. Paul A. Tusz, president of the Granite-Bimetallic Consolidated Mining Co., purchased the property for $1,027, the amount of the taxes. Chas. D. McClure, of St. Louis, is the principal stockholder.

Tiger vs. Nancy Hanks.—Judge Clements, before whom this apex case was recently tried, has made a personal inspection of the underground workings. Both sides were on hand to point out their contentions regarding the continuity or non-continuity of the vein.

LEWIS & CLARKE COUNTY.

Jay Gould.—Ten stamps are being added to the 20-stamp mill on this property, 30 miles west of Helena. The Standard Ore Co. is in control with J. Campbell Cory at the head.

MADISON COUNTY.

H. Pagnuelo, of Montreal, Can., is to bond for $50,000, six claims of 20 acres each in Goodrich gulch 15 miles east of Alder creek. Frank C. Lavigne, of Spokane, owns one-fifth interest in the claims and has an option on the balance. A $20,000 placer outfit is to be put in, including a pipe-line.

SILVER BOW COUNTY.

Press despatches state that both Judge Clancy and Judge Harney have passed on the new change of venue law and declared it unconstitutional. Judge Clancy refused to grant a change of venue to the Anaconda Co. in one of its suits against the Montana Ore Purchasing Co.

Original Consolidated Mining Co.—Senator W. A. Clarke has organized this company, with a capital of $10,000,000. It is said the company is formed for the purpose of taking control of all of Senator Clarke's mines in Butte. The directors are: W. A. Clarke, W. A. Clarke, Jr., C. W. Clarke, A. J. Johnson, A. H. Wethey, W. M. Bickford and C. B. McBroon.

OREGON.

LINN COUNTY.

(*From Our Special Correspondent.*)

Lucky Boy Co.—The 15-stamp mill on this property, in the Blue river district, near Brownsville, is closed and will be removed to the new site 100 yards down the mountain, where 25 additional stamps will be added. Power for operating the new mill will be furnished by the electric plant of the company on the McKenzie river, about six miles from the mill. This power plant will also furnish power for other mines in the district.

SOUTH DAKOTA.

LAWRENCE COUNTY.

(*From Our Special Correspondent.*)

American Mining Co.—Work contemplated on the Ragged Top embraces a large electric power plant on Spearfish river, which will operate the machinery at the top of the hill and furnish power elsewhere.

Clover Leaf Mining Co.—The output continues to increase. The remaining 20 stamps will soon be working, making 60 in all. The water is giving less trouble than ever.

Deadwood-Standard Gold Mining Co. — The Spearfish has stopped negotiations for the purchase of the Deadwood-Standard and the latter company is preparing to start its mill in early spring. A new tunnel has been driven, connecting with several bodies of ore, so that mining may be conducted without regard to the weather. Ore will hereafter go to the mill in tram cars instead of wagons.

Empire State Gold Mining Co.—This company has been reorganized. Work has been resumed at the Golden Slipper. J B Safford is in charge of the work at Hill City.

Golden Crest Mining Co.—The last cleanup at the cyanide plant resulted in nearly $10,000 in bullion. Some trouble has been experienced in melting the precipitates from the cyanide mill, but no further difficulty is expected.

Homestake Mining Co.—Machinery is being installed for the additional 100 stamps at the Amicus mill, making 240 in all. The mill building is being enlarged and battery blocks have been set. The new engine is on the ground. The cyanide plant No. 1 is being greatly enlarged and No. 2 will be rearranged.

Spearfish Gold Mining & Reduction Co.—The new air compressor is in place, pipes have been laid to the mine, half a mile distant, and air drills are being installed. The company is preparing to put in additional cyanide vats. The mill is treating 225 tons per day and with the new vats will be able to treat its full crushing capacity, 300 tons.

Penobscot Mining Co.—A rich shoot of ore is reported in one of the new headings. The mill is running one shift and daily shipments are made to outside smelters. An air shaft is planned 1,500 ft. east of the main shaft for ventilation and as an escape shaft.

Ruby Gold Mining & Milling Co. — The new mill is complete, but will not be started until spring. There are two batteries of Merrall stamps, power being furnished by a gasoline engine.

PENNINGTON COUNTY.

(*From Our Special Correspondent.*)

Ohio-Deadwood Gold Mining Co.—Work has been resumed in the main tunnel and work on the new mill will commence shortly.

UTAH.

BOX ELDER COUNTY.

(*From Our Special Correspondent.*)

Century.—An important strike is reported by the manager, P. W. Madsen, of Salt Lake. It is a new 6-ft. vein, and 16 stamps are dropping.

JUAB COUNTY.

(*From Our Special Correspondent.*)

Utah Mine.—A shipment of 26 tons of silver-lead ores, marketed this week, brought $3,200.

SALT LAKE COUNTY.

(*From Our Special Correspondent.*)

Columbus Consolidated.—Equipment for a 100-ton concentrator has been purchased to be erected near the company's mines at Alta. President Jacobson expects to have it ready early in May.

Copper Prince Consolidated.—This company has just been organized to operate the Copper Prince and Silver King groups at Alta. The capitalization is 500,000 shares, of $1 each. Tony Jacobson is president; C. K. McCormick, vice-president, and Charles H. Post, secretary. The properties adjoin those of the Continent-Alta mines.

Ohio Copper.—This company's Bingham concentrator is turning out two grades of concentrates. One carries about 37% copper and the other about 27%. From 125 tons of crude ore, 20 tons of concentrates are produced daily.

SUMMIT COUNTY.

(*From Our Special Correspondent.*)

New York Bonanza.—The first shipment of ore was somewhat disappointing to the management. The values ran 34.1 oz. silver, 8% lead and 80c. gold.

Park City Shipments.—During the week ending February 8 shipments were: Daly-West, 3,983,000 lb.; Silver King, 1,842,560; Keith-Kearns, 138,000; New York Bonanza, 42,000.

WASHINGTON.

FERRY COUNTY.

(*From Our Special Correspondent.*)

Pearl Consolidated.—A two-compartment shaft is started on the Lone Pine ground, on the apex of the No. 1 vein, and will be sunk about 260 ft. A 20 h. p. boiler and 12 h. p. steam hoist will be used, for which an order will be placed immediately. At present eight men are employed, working 10-hour shifts.

FOREIGN MINING NEWS.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—For the week ending February 6 shipments aggregated 18,318 tons, as follows: Granby 12,540; Mother Lode, 4,000; Emma, 429; Senator, 132; Oro Denoro, 693; Athelstan-Jack Pot, 524. Total for the year to date, 84,075 tons.

British Columbia Copper Co.—C. E. Laidlaw, W. H. Thomas and Charles H. Ropes have retired from the board of directors of this company and F. G. Renner, Josiah C. Reiff and W. W. Trimpi are elected in their stead. The plans for the consolidation of the company with the Snowshoe Gold & Copper Mines, Ltd., are near completion.

Granby Consolidated.—A deal is reported closed with the Oro Denoro Mines, Ltd., for two years' output of the two ore quarries of the Oro Denoro mine. The Granby is said to have purchased a block of treasury stock of the Oro Denoro and the proceeds will pay the debt which the latter assumed when it bought the assets of the King Mining Co. The Granby Company has also acquired a 90-day bond on the Shamrock III. and Reliance, in Summit camp, from H. Lander, of Eholt.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments.—For the week ending February 6 shipments amounted to 8,310 tons, as follows: Le Roi, 4,860; Centre Star, 1,200; War Eagle, 1,080; Kootenay, 100; Jumbo, 150; Le Roi No. 2, 580; Le Roi No. 2, Elmore process mill, 340; total for the week, 8,310; year to date, 48,878 tons.

BRITISH COLUMBIA—SLOCAN DISTRICT.

Arlington & Ricowilabi.—This mine, on Springer creek, near Slocan City, is to have a 50-ton mill shortly, according to J. F. Collom, managing director. The Ricowilabi company is composed of men in control of the Arlington. The officers are: R. P. Rithet, of Victoria, B.C., and San Francisco, president; Alexander Williamson, of San Francisco, vice-president; J. Frank Collom, managing director; John Lawson, secretary and treasurer; Thomas Binney, director. The Ricowilabi owns the Speculator, silver group of 300 acres, adjoining the Arlington. The company has a bond issue of $200,000, and there is a balance of $60,000, which will be used in erecting a mill. Professor Buck, of Tufts College, Medford, Mass., will install and operate the plant.

BRITISH COLUMBIA—YALE DISTRICT.

International Gold Mining Co.—A 6-stamp mill is to be installed on this property near Yale. Excavating has begun. Saw mill and machinery will also be set up. A six months' supply of ore is reported ready for the mill. Louis A. Thomas is superintendent.

ONTARIO.

(*From Our Special Correspondent.*)

Leonidas Merritt and several Duluth men have been exploring for iron ore in the southern part of Hunter's Island. The openings show 50% iron and a little sulphur. This is the most favorable exploration yet on the continuation of the Vermilion range in Canada. The party is working between Carp lake and That-man's lake, but some prospecting is in progress near This-man's lake, and further on toward The-other-man's lake. Iron ore locations were mapped here by the geological survey of Canada so far back as 1890, and the croppings of jasper and lean ore have been examined by Van Hise and others of the United States geological survey. The formations are very strong and persistent, and include quartzites, soft grey schists, altered quartz porphyries, with large areas of greenstone and clay slates. The International Iron Mining Co., organized under Canadian laws. with $1,000,000 capital, is carrying on the work begun by Mr. Merritt.

International Iron Co.—This company in its work on Hunters' island, north from Minnesota, is said to have cut 50 ft. of magnetite, showing about 60% iron, and only traces of phosphorus and sulphur. This is the only iron exploration now undergoing development of the international line west of Lake Superior.

MEXICO.

SONORA.

Greene Consolidated Copper Co.—At a meeting of the directors in New York terms of subscription to the proposed issue of new stock were fixed. The plan provides for the payment of 50% when the subscription is made, 25% in 30 days and 25% in 60 days. Emil Berolzheimer was elected a member of the executive committee in place of A. W. Burchard.

SOUTH AMERICA.

DUTCH GUIANA.

(*From Our Special Correspondent.*)

The gold production of the colony in 1903 is officially reported, by districts, as follows, in grams: Surinam, 243,183; Saramacca, 149,462; Marowine, 36,775; Lawa, 230,472; total, 659,892 grams. This would be equal to $438,564 in value.

MINING STOCKS.

(Full quotations given on pages 304 and 305.)

New York, Feb. 17.

The important factor in the market is the investing public, and they seem still to be reflecting on their losses months ago.

Amalgamated Copper, from $45⅝, made an advance to $49¼, and according to report is being "caged" in anticipation of a further recovery. A peculiarity about the recent trading has been the cutting almost in half of sales made at a systematic advance. This suggests manipulation. Anaconda moved up from $16 to $17⅜ on light transactions. Greene Consolidated, of Mexico, has given the curb brokers more ammunition to riddle the stock. The defeat of the Gates-Ray-Hawley faction by a vote of 478,494 shares in favor of the increase in the capitalization from $7,200,000 to $8,640,000 at the recent stockholders' meeting, intimates that some changes may soon be made in the directorate of the company. The new issue of 144,000 shares, par $10, to be subscribed for on a pro rata basis by stockholders up to February 27, will meet all obligations of the company. Any stock not taken in this way will be subscribed for by a syndicate composed of stockholders. Recent sales of rights to this new stock have been made on curb at $30@$24, while the old shares brought $11@$10. A suggestion was made at the meeting that a dividend of 5% be declared not later than May next, and at the same rate quarterly thereafter. After careful consideration the resolution was withdrawn.

In the gold and silver list there has been more animation. Standard Consolidated of California, sold at $2.50@$2.55, Elkton of Cripple Creek, Colo., at 63@64c., and El Paso at 65c. The Comstocks are still "feeding" on Ophir's oats, valued at $5.50. It is rather singular to see Mexican go up $1 to $2.40 just as an assessment of 15c. is called—the highest rate in a long time. Consolidated California & Virginia gained 50c. to $2.05, and other shares proportionately.

Standard Oil caused some surprise when it declared the uncommon quarterly dividend of $16. This compares with $20 paid for the March quarter in every year since 1899, when $6 was declared. A singular coincidence is that sales of the stock have been made this week at $645—$10 less than December last when the dividend was $4 less.

Boston. Feb. 16.

(*From Our Special Correspondent.*)

The market in this city has fallen into a rut of dullness bordering on stagnation. The copper market has developed a tendency to improve. During the week prices have generally hardened, but there has been no feature and the trading has been of the desultory kind. This is not unusual, as the market for copper has not responded perceptibly to good news for some time. The consensus of opinion is that present conditions will prevail until the powers that be are ready to change them.

Copper Range Consolidated shows perceptible signs of animation, although very insignificant as yet. The price is $1 higher at $41.25, notwithstanding the labor agitation in the Lake district. Directors and officers of the Champion and Trimountain companies were re-elected last week. These are two of the Copper Range constituent companies. Calumet & Hecla is $6 higher at $446. A $10 dividend was announced to-day, which is the third consecutive dividend at this rate. A year ago $5 was paid. Utah Consolidated continues the most active stock, yet price fluctuations are narrow. The price is $1.25 higher than a week back at $33. Centennial is selling with a $2 assessment added, and closed at $18. Sentiment on this stock is moderately bullish. Parrot has advanced $1.75 to $24.75. In consequence of the late Montana decision in the MacGinniss case action toward the resumption of dividend payments is anticipated.

Dominion Coal has been weak, but now shows a steadier tone around $60. The late liquidation is said to have been due to the fact of a possible reduction or passing of the dividend. There is a considerable floating debt. Bingham hangs heavy around $20. United States has fluctuated between $20 and $21.

Colorado Springs. Feb. 12.

(*From Our Special Correspondent.*)

The mining market has, this week, been less active than for some time past, although prices have not suffered to any great extent. Quotations as a rule remained stationary, and the advances where occurring have been equalized by the declines. The feature of the trading was Portland, whose selling price touched $2 per share, the highest point for considerably more than a year. The declaration of 6c. per share dividend last month has had a bracing effect on the sale price of these shares, and a still higher quotation is not unlooked for.

The prospects now seem good for the early opening to leasers of the Stratton properties, which are scattered all over the Cripple Creek district. Should this be done, employment will be given to at least 1,000 additional miners.

The disclosure of bonanza ore in the northern section of the camp, on Ironclad hill, has caused a rush of prospectors to that locality, and leases are now at a premium there. The recent rich finds are holding out well, and the lucky leasers are realizing a fortune from their operations.

San Francisco. Feb. 11.

(*From Our Special Correspondent.*)

Comstock shares have been very much quieter this week, and the principal business done has been taking profits in a small way on casual turns. Prices have been rather firm, however, and there have been no heavy falls recorded. Ophir sold at $3.75@$3.80; Consolidated California & Virginia, $1.55@$1.60; Mexican, $1.55; Sierra Nevada, 65@60c., and Gould & Curry, 42c. per share.

The monthly statements of the mining companies, as filed in their offices on Monday showed cash on hand February 1, as follows, with all bills paid to that date, unless otherwise stated: Alpha Consolidated, $3,948; Alta, $405, with liabilities of $4,987; Andes, $44, with $2,500 due bank; Belcher, $3,098, with January expenses partly unpaid; Best & Belcher, $703, with indebtedness of $1,000; Bullion, $397; Caledonia, $1,255, with January expenses unpaid; Consolidated California & Virginia, $19,174; Crown Point, $3,079; Consolidated Imperial, $106; Consolidated New York, $2,415; Confidence, $1,770, with January expenses unpaid; Challenge Consolidated, $534; Chollar, $4,520, with January expenses unpaid; Exchequer, $2,201; Gould & Curry, $1,512; Hale & Norcross, $5,384; Julia Consolidated, $1,052; Justice, $4,138; Lady Washington, $110, with indebtedness of $485; Mexican, $1,553; Ophir, $57,153, with six car-loads of ore to be reported on; Overman, $3,432, with January expenses unpaid; Potosi, $3,650, with January expenses unpaid; Savage, $727; Sierra Nevada, $1,589; Silver Hill, $14,840; Standard Consolidated, $93,683, with January expenses and January clean-up to be accounted for; Syndicate, $2,689; Union Consolidated, $6,099; Utah Consolidated, $6,134.

Segregated Belcher reports an indebtedness of $114 on February 1, with no cash.

The following companies in the above list now have assessments in course of collection: Andes, Bullion, Caledonia, Challenge, Gould & Curry, Mexican, Savage and Utah Consolidated.

On the San Francisco & Tonopah exchange business was quite active, and advances in several stocks were recorded. Montana Tonopah sold at $1.45; Tonopah Belmont, 60c.; Evelyn, 25c.; Rescue, 6c. Rescue was bought very freely by outsiders.

On the California exchange the market for oil shares was rather depressed, and sales were confined to a few stocks. Peerless brought $14 on a sale of 100 shares. Sovereign was quoted at 40c.; Oil City, 32c.; Superior, 7c. In other stocks very little was done.

San Luis Potosi. Feb. 9.

(*From Our Special Correspondent.*)

Exchange on New York during the week dropped from 223¾ to 222¾.

Mining shares were almost entirely ignored, there being a few sales of Victoria at $155; Aldebaran, $73; Old Abe, $7; Santa Rosa, $3; La Union, $52, and a deal in La Paz, of Matehuala, S. L. P., at $168.

COAL TRADE REVIEW.

New York, Feb. 17.

ANTHRACITE.

The anthracite coal trade continues active. Another cold wave has increased retail buying all over the country, but wholesale business, though it has undoubtedly benefited greatly by the prolonged cold weather, has not yet shown the increase that might appear inevitable. The consumption of coal is heavy, and it is altogether likely that there has been a larger amount burned since November 15 than in any equal period in the history of the trade, but the tonnage shipped from the mines is not heavy, simply because of the great activity in the trade last summer, when every dealer laid in, as he thought, coal enough to last him through the winter. An ordinarily mild winter would have seen great stagnation in the trade. In spite of the probable drop in prices six weeks from now, trade will undoubtedly be very active during the balance of this month, and if March lives up to its reputation, a lot of coal will be wanted for prompt delivery before April 1.

In the Northwest extremely cold weather has prevailed. The movement of coal from docks has been delayed, and the railroads have been having more than their usual midwinter troubles. The demand from country yards is strong. In Chicago territory, where retail demand has been heavy for months, supplies in dealers' hands are now getting low, and as a result there has been a decided increase in wholesale buying. Some coal is arriving all-rail, but, owing to the snowbound condition of most railroads west of Buffalo, a heavy tonnage is sidetracked along the lines. The supplies on docks are still quite good, although the movement from docks is now heavy, owing to the short arrivals of all-rail coal. Along the lower lakes and in Canadian territory there is an urgent demand for coal for immediate needs; indeed, at some points there is talk of a coal famine. This is due to railroads being snowbound with cars of coal sidetracked for weeks. So great is the distress at some points in Canade that there are reports of lighting plants and factories closing down. A considerable amount of coal consigned to Canadian points is sidetracked at Buffalo. The line trade farther east retail demand is brisk and wholesale buying shows improvement. Along the Atlantic seaboard conditions vary. At Boston wholesale buying is beginning to improve, owing to the great depletion of stocks laid in last summer. At New York retail demand, is very brisk, and taxes delivery facilities to the utmost. The coastwise movement of coal at shipping ports is slow, on account of cars being frozen and at receiving ports on account of ice. Conditions at some ports are probably worse than since 1876. The demand for the small steam sizes continues excellent. There can be no accumulation of these sizes with the prevailing cold weather which greatly impedes work at washeries. Of the prepared sizes,

stove is most wanted at New York harbor points. There is a disposition among the railroads to get coal down to storage yards near tidewater in anticipation of trouble when the ice gorges that have formed along the rivers in the anthracite region break up. Should a sudden thaw come with a heavy rainfall the damage would undoubtedly be heavy. The gorges on the north fork of the Susquehanna are said to be worse than anything the oldest inhabitant can remember.

BITUMINOUS.

The Atlantic seaboard bituminous trade continues quiet, in spite of cold weather and shipments interrupted by storms and ice. It is stated that there was no formal meeting of the coal trade at the Waldorf last week as reported, though certain interests did meet and discuss trade questions. It is said that the discussion dealt with the necessity of reducing wages at the mines, rather than with mine prices. It is quite possible that there will be no formal statement of mine prices. Some contracts are reported taken at $1.25 at the mine, and others are talked of at $1.

As to mining rates, though operators unanimously favor reductions, it is not likely that anything will be done until there has been another meeting of the miners and operators in the Central West, as the mining rate in the central Pennsylvania field, annually adjusted at Altoona, is naturally based on what has been previously done at Indianapolis.

In the far east business is quiet. Receipts by water at Boston yards have been greatly bothered by ice, but this does not affect the market, owing to the arrivals of all-rail coal. Along Long Island Sound also receipts of coal are delayed by ice, but demand is quiet, and less than the usual proportion of tonnage is wanted. At New York harbor trade continues rather dull. There has been a little improvement in all-rail buying, but demand is still far from brisk.

Transportation from the mines to tidewater continues variable. Some coal comes through in less than a week, but more takes a longer time. Car supply at the mines is generally ample. In the coastwise vessel market vessels are in demand. Shipments from Baltimore and Philadelphia ports are again temporarily blocked by ice.

Birmingham. Feb. 15.

(*From Our Special Correspondent.*)

There is a good demand for coal in this State. Considerable coal is still going into the Louisiana market, notwithstanding there have been some heavy shipments down the river by the Pennsylvania producers. Heavy shipments of coal are being made from this State to Pensacola, the coal to be used in the shipping trade at that point.

State Mine Inspector J. M. Gray has completed his compilation of figures as to the coal production in this State in 1903. The total production amounted to 11,700,753 tons. By counties the report is as follows: Bibb, 1,659,402 tons; Blount, 53,483; Cullmann, 136,191; De Kalb, 2,000; Etowah, 111,680; Jackson, 15,407; Jefferson, 6,261,048; Marion, 73,407; Shelby, 121,676; St. Clair, 151,100; Tuskaloosa, 618,524; Walker, 2,377,919; Winston, 38,916; smaller mines (estimated), 80,000. During the year 1903 there were 19,356 men employed in and about the mines. There were 57 men killed in the coal mines of Alabama last year, or 2.95 per 1,000 employed. One man was killed out of every 339.57 employed. In 1902 there were 10,329,479 tons of coal produced, with 17,509 men employed in and around the mines. There were 50 men killed in the mines.

Chicago. Feb. 15.

(*From Our Special Correspondent.*)

Wholesale business in both anthracite and bituminous has been very good during the last week. The severe winter is beginning to tell on the heavy stores of anthracite laid in last summer and autumn throughout Chicago territory, and orders are coming in more freely than at any other time since the begining of the season. There is, however, no danger of a scarcity of anthracite or of a shortage in any community due to railroad troubles. The demand for anthracite is especially vigorous from the local dealers, who are beginning to run out of the large stock laid in by them early in the season. Country demand is good for the all-rail trade, which, as in other seasons, is increasing with the advance in the winter. From the southern territory there is reported an unusual demand for anthracite, testifying to the severity of the winter and its far-reaching effects.

A better market for the leading grades of bituminous has prevailed for the week, encouraging dealers and operators alike. The greatest demand has been, as usual, for the western coals, Indiana and Illinois, especially prepared sizes, sales of which have increased greatly. Run-of-mine and screenings continue in heavy demand, the former at $1.60@$2.10, and the latter at $1.50@$1.75. Western lump is $2@$2.50. Smokeless is somewhat less in demand; run-of-mine brings $3.50@$3.65 and prepared sizes $4@$4.35; the market continues lighter for smokeless than it was last year at this season. Hocking is in advanced demand and brings $3.40@$4; it is growing in popularity, and there are more grades than were ever before on the Chicago market, much to the detriment of the best Hocking. Gas coals continue in demand, with Youghiogheny and Pittsburg quoted at $3@$3.25; the market for cannel is also good, the coal being quoted at $5@$5.25. There is a good market for smithing at $3.75 @$4 per ton.

Cleveland. Feb. 16.

(*From Our Special Correspondent.*)

The coal situation in this territory has changed rather abruptly during the past week. It was feared there would be a serious shortage of coal, due to the congestion on the railroads. It seems, however, that the railroads, while congested with general lines of freight, took good care of the coal trade, and as a result there is plenty of coal in this territory. The steam coal situation is especially easy, the consumption having been lighter than was expected and the supply better. This has permitted an easing of prices. Pittsburg coal is bringing $1.10 at the mines, while Ohio coal is bringing $1.10@$1.15.

There is a very good demand for domestic coal at present, the long-drawn-out winter weather having reached a climax during the past week in some of the most aggravating weather which has been experienced this year. The sudden fall of temperature to several degrees below zero increased the demand. The supply has been rather short, the mines having been deprived of cars for two or three days. The prices have held firm, the basis being Massillon, which runs $2.80 for lump at the mine, bringing the price to the dealers in Cleveland to $3.50.

The coke situation is a little easier. Prices seem to have struck bottom and are holding steady. Good 72-hour coke is bringing $2.25 to $2.50 at the oven, and high sulphur cokes range between $2 and $2.15 at the oven. Furnace coke is bringing $1.50 to $1.60 at the oven.

Pittsburg. Feb. 16.

(*From Our Special Correspondent.*)

Coal.—No effort is being made by coal operators to close contracts for the year, and the demand is unusually brisk and prices firm. Many mines are idle, owing to a scarcity of railroad cars, and if the severe weather continues there is no doubt but that coal will command fancy prices. Surprise was caused here to-day by the announcement that the special committee appointed to arrange for another conference on the mining scale for the four States, Pennsylvania, Ohio, Indiana and Illinois, parties to the inter-State agreement, had failed to agree. This necessitates the reconvening of the joint convention and bringing together again 515 miners' delegates and about 350 operators. The convention will reassemble at Indianapolis on Monday, February 29. The operators are bound to pay no more than the 1902 scale, and the miners insist on a renewal of the present scale, which is 12% higher. It is rumored to-day that the operators desire a suspension on April 1, when the new scale should go into effect, as it will stiffen the market at a time when annual contracts are made. A short suspension will clean up all stocks, it is said, and put the industry in good shape for another year. The river mines have not been operating for several weeks on account of the ice in the river. There are about 12,000,000 bush. loaded. About 2,000,000 bush. were shipped south last Friday and Saturday. More would have been sent out, but for the dangerous condition of the rivers by floating ice.

Connellsville Coke.—The shipments fell off considerably, due to the severe weather, which caused a shortage of railroad cars. This has had an effect on prices, which are much firmer. Furnace coke is now quoted at $1.60@$1.65 for the standard Connellsville grade, and foundry coke is quoted at $2@$2.25. The production last week, according to the *Courier*, was 203,333 tons, an increase of over 10,000 tons compared with the preceding week. The shipments were 7,537 cars, a decline of about 800 cars. The shipments were distributed as follows: To Pittsburg and river tipples, 3,142 cars; to points west of Pittsburg, 3,320 cars; to points east of Everson, 1,075 cars.

San Francisco. Feb. 11.

(*From Our Special Correspondent.*)

The market continues quiet, with no change in prices. Sales of fuel oil continue good.

Pacific coast coals in large lots to dealers are quoted as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle and Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; white ash, $5.25. For Rocky mountain coals, ex-car, to dealers, prices are $14 for Colorado anthracite, $11.50 for Castle Gate, Clear Creek, Rock Springs and Sunnyside. Eastern coal is still nominal at $14 for Pennsylvania anthracite, and $13 for Cumberland, with very light stocks. Foreign coal in cargo lots is quoted at $13 for Welsh anthracite, $8.50 for cannel, $7.50 for Wallsend and Brymbo.

Foreign Coal Trade. Feb. 17.

Imports of coal and coke into Germany for the full year are reported as follows, in metric tons:

	1902.	1903.	Changes.
Coal	6,425,658	6,766,513	I. 340,855
Brown coal	7,882,010	7,962,123	I. 80,113
Coke	362,488	432,819	I. 70,331
Totals	14,670,156	15,161,455	I. 491,299

Imports of coal were chiefly from Great Britain, while the brown coal (lignite) was all from Austria. The coke came chiefly from Belgium.

Exports of coal and coke from Germany for the full year are reported as below, in metric tons:

	1902.	1903.	Changes.
Coal	16,101,141	17,388,149	I. 1,287,008
Brown coal	21,776	22,499	I. 723
Coke	2,182,383	2,525,136	I. 342,753
Totals	18,305,300	19,935,784	I. 1,630,484

Exports of coal were chiefly to Holland, Austria, Belgium and Switzerland; of coke, to France and Belgium.

The coal production of Germany for the full year is reported as follows, in metric tons:

	1902.	1903.	Changes.
Coal	107,473,933	116,664,376	I. 9,190,443
Brown coal	43,126,281	45,955,558	I. 2,829,277
Total mined	150,600,214	162,619,934	I. 12,019,720
Coke made	9,202,796	11,509,259	I. 2,306,463
Briquettes made	9,214,226	10,476,170	I. 1,261,944

Of the total mined Prussia furnished 108,989,879 tons of coal and 38,460,232 tons of lignite, or brown coal, last year.

The production of coal in the leading districts of France for the year is reported as follows, in metric tons:

	1902.	1903.	Changes.
Nord	5,430,298	6,323,820	I. 893,522
Pas-de-Calais	13,556,533	16,614,280	I. 3,057,747
Totals	18,986,831	22,938,100	I. 3,951,269

The increase was large, especially in the Pas-de-Calais; it was due chiefly to the absence of strikes last year.

The imports of coal into Chile in the year 1903 amounted to 809,654 tons, of which 65,556 tons were used for smelting purposes. In 1902 receipts were 829,608 tons, of which 64,843 tons were for smelting. England and Australia furnished all but 6,825 tons American coal in 1903.

IRON TRADE REVIEW.

New York, Feb. 17.

The iron trade shows some improvement this week, and more activity is noted both in inquiries and in actual sales of material. Pig iron continues somewhat depressed, so far as prices are concerned, but the fact that several furnaces are being put into blast is encouraging to the trade. The United States Steel Corporation is increasing its pig iron production very considerably. This indicates that a demand for material is in sight, and it indicates probably that the corporation will make few or no purchases from the outside makers for some time to come.

In finished material prices for billets seem to have been re-established for the present. There is some inquiry for structural material and plates, though it has not materialized into very much business as yet. More trade has been done in bars, and there seems to be an increased disposition to place orders ahead.

While it cannot be said that the deadlock on steel rails has been broken, some orders have been placed. The Harriman lines have taken 50,000 tons at the pool price of $28 at mill. Of this order 15,000 tons go to the Tennessee Coal, Iron & Railroad Co.'s mill at Ensley. The Atchison, Topeka & Santa Fe is also said to have placed an order, and the rail-men are hopeful that more will follow. The principal eastern lines, however, are still holding back.

Negotiations for the consolidation of the interests of the Tennessee Coal, Iron & Railroad Co., the Sloss-Sheffield Steel & Iron Co. and the southern interests of the Republic Iron & Steel Co. have progressed so far that a committee has been appointed to value the properties of the different companies.

Birmingham. Feb. 15.

(From Our Special Correspondent.)

Though the pig iron market in the Southern territory is very quiet, there is denial that iron is being sold under $10 per ton for No. 2 foundry. The sales are in small lots, and, for the greater part, are for immediate delivery. The shipments of iron from the Southern territory are quite heavy and steady, but the orders for the iron were received the last of the past year and during the first part of January.

The production in Alabama is still strong and is to be increased, as has been already announced. The Republic Co. will blow in No. 3 furnace, recently relined and repaired, about February 18. No. 1 furnace will be ready about the end of the month. The Sloss-Sheffield Steel & Iron Co. still has six of its furnaces in operation. The Tennessee Coal, Iron & Railroad Co. has made no change in its production.

The following quotations are given publicly: No. 1 foundry, $10.50; No. 2 foundry, $10; No. 3 foundry, $9.50; No. 4 foundry, $9; gray forge, $8.25@$8.50; No. 1 soft, $10.50; No. 2 soft, $10.

There is no change in finished iron and steel. The Gate City rolling mills belonging to the Republic Co. lost two days' operations during the past week on account of scarcity of coal. The plant is in operation again this week. The bessemer mills belonging to the Tennessee Co. have been doing nicely right along. The Anniston mills have also been doing some good work. The steel plant at Ensley, belonging to the Tennessee Co., is doing better now, with the production on a steady increase.

The conferences held the past week between the officials of the Tennessee Coal, Iron & Railroad Co., the Sloss-Sheffield Steel & Iron Co. and the Republic Iron & Steel Co., looking to the final consolidation of interests, were watched with interest by the industrial world. The three concerns have named experts to estimate values of coal and ore lands owned by them respectively and prepare a report. The following gentlemen will perform the work: For the Tennessee, Mr. T. H. Aldrich, on both coal and ore; for the Sloss-Sheffield, Mr. Walter Moore on coal and Mr. J. W. Worthington on ore; for the Republic, Mr. W. M. Given on ore and Mr. C. P. Perrin on coal. It is believed that it will take from six to eight weeks to perform the work assigned to them. The mechanical plants will be valued later.

A meeting of the creditors of the Jenifer Furnace Co. was held in Anniston on Friday last. Mr. J. W. McQueen, of Birmingham, who was appointed receiver for the concern, was named as trustee for the creditors. It is intended to keep the coal and ore mines in operation. The furnace has been out of blast now for several weeks.

Chicago. Feb. 15.

(From Our Special Correspondent.)

The iron market continues to be a lagging one; there have been a number of sales of pig iron in the last week, but the prices have been low; from the $10 Birmingham standard for southern No. 2, firmly maintained two weeks ago, the price has sagged to $9.55, and seems likely to go to $9 before the reaction is finished. This condition seems due to the unwillingness of the buyer—or his inability—to take the iron that is being produced in the South. "If southern were openly at $9, Birmingham," said a prominent agent for southern furnaces, "I doubt if we could sell any more than we are selling to-day. The trade simply cannot take what is being manufactured."

Under the above described conditions, the local price of southern is $13.85 on the $10 Birmingham basis, or $13.40 on the $9.55 basis. The reaction may be only temporary, but the upward movement has been suddenly checked without doubt.

Northern iron continues at $13.50@$14 for No. 2, and is in demand, as heretofore, chiefly for mixtures. Despite the coming together of northern and southern prices, there is no largely increased buying of northern iron; southern is still the favorite in the local market.

Small and numerous sales continue to characterize the market in general, though there is undoubtedly an improvement over the conditions of a month ago in this respect. The pressure is not so great for immediate deliveries, and the former premium of $1@$2 for spot lots is harder to obtain.

Coke is still too plentiful for good prices; it brings $4.75@$5 for 72-hour foundry, and is not being held back by transportation difficulties.

Cleveland. Feb. 16.

(From Our Special Correspondent.)

Iron Ore.—The discussion at the meeting of the Ore Association develops scepticism on the possible output of ore during the coming season. It is shown that the production of ore last year, even with the present light consumption, is but three months ahead of the need for it. Few of the members of the Ore Association are willing to hold to their original positions. This, however, does not change the attitude of the producers of ore toward the prices which are to be charged during the coming year. The smaller producers are adhering to their positions on the question of prices, insisting upon a reduction. The differences seem to be such as cannot be mended.

Pig Iron.—The buying of pig iron has been a little heavier of late, but it is evident now that the consumers of foundry are making belated contracts, some of the sales reported this week having been on the tape for the past two or three weeks. The buying, however, has been largely satisfactory. The sales have been of a rather spasmodic nature, but the whole tendency has been toward greater activity, although at prices ranging lower. In fact, the whole trend of the market has been downward. The present and perhaps the ruling basis of prices is $12.50 for No. 2 in the Valley. Such a price as this precludes the possibility of sales by the southern furnaces in this territory. Those stacks are still holding for $10, Birmingham, which rules above the northern market, the freight being added.

Finished Material.—The difficulties which have assailed the producers of sheets have been aggravated since the failure to agree upon a radical advance in prices. It being impossible to agree upon prices, the smaller consumers have gone back to a state of war, the result being a still further reduction in prices. Some business has been coming out of late, and some of the larger mills are seemingly getting a fair share of the trade, but it is apparent that the bulk of it is going to the smaller producers, who are cutting from $1 to $3 a ton under the quoted association list, which is still based upon 2.50c. for No. 27 black sheets out of stock. The bar situation has assumed new importance under heavy buying. Several lots of 5,000 tons have been covered of late, and the apprehension is that the consumers are getting to cover before an advance in prices is announced. Prices are 1.30c. for bessemer steel, Pittsburg; 1.40c., Pittsburg, for open hearth, and 1.35c.@1.40c., Cleveland for iron. Some of the traction lines in this territory have been buying small lots of rails lately, paying the association price of $28, Pittsburg.

New York. Feb. 17.

Pig Iron.—The market continues quiet. We quote as follows, for northern irons, good brands: No. 1 X foundry, $15.50@$15.75; No. 2 X, $14.75@$15; No. 2 plain can be had for 50c. less; while gray forge is selling around $13.75. For southern irons on dock quotations are: No. 1 foundry, $14.25; No. 2 foundry, $13.75, with lower grades in proportion. No. 1 soft can be had at about $14.25, and No. 2 soft at $13.75.

Plates.—Buying shows an increase, but orders are for small lots. Sheared plates are quoted as follows: Tank, 1¼-in. and heavier, 1.76@1.80c.; flange, 1.95@2.05c.; marine, 2.10@2.15c.

Bar Iron and Steel.—Demand has improved slightly. Refined bars are quoted at around 1.45c., in large lots, with steel at about the same. Common iron bars are as low as 1.30c.

Steel Rails.—The quotations remain $28 for standard sections, f. o.b. mills; light rails, $33@$36, according to weight.

Structural Material.—Large lots at tidewater are still quoted at 1.75@2c. for beams, angles and channels.

Philadelphia. Feb. 17.

(From Our Special Correspondent.)

Eastern pig iron makers are awaiting the demand which seems to have broken out in the West for crude iron. Only a moderate business is being done. The users of basic pig have been buying more freely, and immediate deliveries are now more difficult than they were a month ago. Further trouble is expected with the southern furnaces, and we do not see any upward tendency in sight. It is true that two or three large consumers, notably the cast-pipe makers, have bought quite heavily, and to-day there are negotiations which may close any hour for quite large lots of iron, some of which will not be delivered until well on in the second quarter of the year. Quotations may be given approximately as follows: No. 1 X foundry, desirable brands, $16; No. 2 X foundry, $15; for best makes, $14.50 for some; No. 2 plain, $14; the same for southern iron, rail shipment; some southern No. 2 has been lately contracted for which will be delivered at $13 on dock. Sales of gray forge have been made this week at $13.75; basic nominally $13.75.

Billets.—Brokers who are well posted on billets believe that the immediate future promises a heavier demand.

Merchant Bar.—The rumor that merchant bar had been advanced $2 per ton is looked upon here as groundless. There are too many idle mills in this State for such a thing to be possible. The average quotations for bars are 1.30@1.40 in large lots.

Sheets.—The aggregate of the week's orders warrants the manufacturers in saying business is improving, but the large consumers are not being heard from.

Tubes.—All our shop capacity into which tubes enter is working just now practically full time. Larger orders are coming along.

Pipes.—Pipe work is coming along very nicely, especially for merchant pipe, and agents are now doing a better business than they have any time since January 1. Cast pipe capacity is pretty well sold up.

Plates.—All of our shipyards are in the market for supplies, but it is not known whether they are contracting for later than June delivery. Inducements are still being offered.

Structural Material.—The mill representatives are much pleased with the accumulated work for the past week. The American Bridge

Co. has placed orders in Pennsylvania mills, some of the material being for bridges for the Pennsylvania Railroad Co. east of Pittsburg.

Old Rails.—Holders are asking prices which buyers will not pay. The advance to $16 is sufficient to bar off all business for the present. A little business has been done in old steel rails at $12.50.

Scrap.—Some of our larger scrap dealers have been in Baltimore for several days, and it is understood they have secured no small amount of stuff.

Pittsburg. Feb. 16.

(*From Our Special Correspondent.*)

The iron and steel markets show a steady improvement and the outlook is gradually growing brighter. Even the pig iron trade seems to be picking up, although there has been no extensive buying and prices are low. All contracts for pig iron now made are for early delivery, but, with the daily increase in orders for finished material, it is expected that active buying for future shipments soon will begin. The Neville Island and the Edith blast furnaces of the American Steel & Wire Co., located in the Pittsburg district, were put in blast yesterday, both having been idle for about three months. All the mills in the district are active and many are on double turn. The demand for merchant pipe has become so heavy that the National Tube Co. made a determined and successful attempt to put its Continental works in full operation. The Amalgamated Association ordered a strike at this place last August, and since that time the company has been trying to run it on a non-union basis, but with poor success. Last week several hundred skilled workmen were engaged, and yesterday the plant was reported to be in full operation. The Amalgamated Association has not given up the fight, and officers say the large force of men were taken from mills that are temporarily idle and will desert when their old places are open to them. Merchant pipe and wire products lead all other finished lines. The Pittsburg Steel Co., the largest independent wire producer, has advanced its prices $1 a ton, and it is believed the leading producer will announce a similar advance this week. The independent concern is well filled with business for over a month and did not care to accept any more orders at the old price. This will be the second advance this year, as an increase of $1 a ton was made on January 9. The improvement in the wire trade began early in December, when, by agreement, all shading of prices was stoppped. The market, as a result, became firm and buying was stimulated. All doubt as to the price of steel rails was removed when the Harriman lines placed orders for 50,000 tons at the pool rate of $28. Of this order 35,000 tons went to the United States Steel Corporation and 15,000 to the Tennessee Coal, Iron & Railroad Co. This practically settles definitely the price for steel rails, as the Harriman interest was the most prominent in the demand for a lower rate. In addition to this large contract it is reported that the Atchison has placed an order for 15,000 tons and the New York Central for an additional 10,000 tons. It is believed that other large contracts soon will be placed. Heavy buying in many finished lines, particularly structural material, is confidently expected. The rebuilding of Baltimore, of course, will bring a large amount of business to the Pittsburg mills, and the bridge across the Monongahela river to be built by the Jones & Laughlin Steel Co. will require a large tonnage of steel. The sheet trade shows an improvement and prices are firmer. A meeting of the Independent Sheet Manufacturers' Association was held here during the week and it was agreed to stop all cutting of prices and not to sell at less than the minimum price quoted by the American Sheet & Tin Plate Co. There has been no demand by customers for lower rates.

Pig Iron.—There has been some buying of pig iron during the week, but prices have been low. One interest reports the sale of from 4,000 to 5,000 tons of bessemer iron at prices ranging from $12.75 to $13.25, Valley furnaces. It was in lots of 200 to 1,000 tons, for delivery within 30 days. The total sales for the week may reach 10,000 tons. In foundry and forge, sales have been confined to small lots. Foundry No. 2 can be bought at $13.25; Pittsburg and gray forge is quoted at $12.75@$13, Pittsburg.

Steel.—The steel market seems to be a trifle firmer this week. Some sales of bessemer and open-hearth billets were made at the pool price of $23. It is explained that the shading of prices to $20, mentioned last week, was not an actual cut of $3 in the price, but the low rate was obtained through a trade in pig iron and coke. There is a better demand for steel bars, and at a meeting held last week the price of 1.30c. was reaffirmed. Some interests represented urged an advance, and another meeting was called for yesterday. The question was discussed at length, but prices were not disturbed. Another meeting will be held soon, at which, it is believed, an advance will be ordered. Plates continue firm at 1.60c.

Sheets.—The sheet market seems to be in much better shape than it has been for some time. The independent manufacturers have agreed to maintain prices based on 2.30c. for black and 3.30c. for galvanized, No. 28 gauge. Sales at $1 a ton above those figures are reported. Roofing is held at $1.75 a square for painted and $2.85 for galvanized, 2½-in. corrugations, No. 28 gauge.

Ferro-manganese.—Prices remain about the same, 80% domestic still being quoted at $44@$45.

Cartagena, Spain. Jan. 30.

(*Special Report of Barrington & Holt.*)

Iron and Manganiferous Ores.—The market has been inactive. Buyers are offering prices which miners consider too low. Great complaint is being made of the government dynamite monopoly. A case of dynamite—25 kg.—which formerly cost 75 pesetas, now costs 135 pesetas. The difference amounts to a large sum, considering that about 155,000 cases are consumed in this district yearly. No shipments of ore reported for the week.

Quotations for ordinary 50% ores are slightly lower, 6s. 6d.@6s. 9d., with 6d. more for low phosphorus ores. Specular 58% ore is quoted at 9s.; magnetic ore, 60%, 11s. 3d. for lump and 9s. 3d. for smalls. Manganiferous ores range from 9s. 6d. for 12% manganese and 35% iron up to 14s. 3d. for 20% manganese and 20% iron.

Pyrites.—Iron pyrites, 43% sulphur and 40% iron, are quoted at 10s. 3d. per ton. Shipments for the week were 450 tons to Genoa, Italy.

CHEMICALS AND MINERALS.

(*See also Prices-Current, page* 306.)

New York, Feb. 17.

Trade is seasonably good, and as a rule prices are firm, particularly for imported substances which are influenced by the higher ocean freights and insurance rates, the result of the far Eastern hostilities.

The Imperial Salt Co., the shadow of the old Federal Salt Co., which at one time controlled about 90% of the trade on the Pacific coast, is executing its threat of ruinous competition against the independent producers known as the Amalgamated Salt Co. Prices are being cut, and, compared with the arbitrary schedule of the old trust, are very low. For instance, a cargo of salt was lately brought from Mexico to San Francisco, Cal., at a cost of $9 a ton, and subsequently marketed at $1.50. Of course this is an unusual instance, but reference to it rather hints at the low prices the Imperial Co. will sell its stock of 30,000 tons, and the Amalgamated Co. its 100,000 tons. These stocks are about 15,000 tons greater than the total production in California in 1903.

Caustic Soda.—Substantial orders far into 1905 have been taken recently at $1.75@$1.80 per 100 lb. for high test, and $1.85@$1.90 for 60%, f. o. b. domestic works.

Cyanide.—Quiet here at 19.5@20c. per lb. Imports are mostly in small lots, and export trade is uninteresting.

Bleaching Powder.—Jobbers have moved small orders from dock at $1@$1.05 per 100 lb. for Continental, and $1.10@$1.125 other makes. A few future delivery contracts are reported at $1.25 for prime British and American, and $1.20 for Continental, at seaboard. An attempt is being made to introduce Italian electrolytic bleach in this market, and a large maker is negotiating with New York firms to accept the agency. So far the terms offered at this end have been considerably below ruling market prices. Another difficulty is the inability of certain large importers to find consumers for a greater quantity of bleach than is now supplied by foreign manufacturers whom they represent.

Copper Sulphate.—No difficulty will be experienced by large consumers to buy at $5@$5.10 per 100 lb., f. o. b. New York. In some quarters reports indicate a better export trade, but considering that this is usually the opening of the busy season, there should be no excitement in the market. Better far is serious thought on how to combat importers, who are awake to all opportunities for gaining a footing in this market.

Acids.—Apparently the continued strength in the markets for raw materials has nearly dissipated the hope of acid makers that prices will be lower. Consequently there is talk of advancing nitric acid.

We quote as below per 100 lb., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°	$1.50	Oxalic, com'l	$5.00@$5.25
Muriatic, 20°	1.60	Sulphuric, 50°, bulk, ton	13.50@14.50
Muriatic, 22°	1.75	Sulphuric, 60°	1.05
Nitric, 36°	4.50	bulk, ton	18.00@20.00
Nitric, 38°	4.75	Sulphuric, 66°	1.20
Nitric, 40°	5.00	bulk, ton	21.00@23 00
Nitric, 42°	5.50		

Brimstone.—Arrivals lately have been sufficient to meet the demand of regular consumers and leave a small quantity that can sell at $22.75@$23 per ton for best seconds. Shipments are quoted $22@$22.25. Best thirds are nominally 50c. less than seconds. Speculation is rife as to the influence of the Russo-Japanese war on the sulphur market. Both countries will consume large quantities of sulphur; Japan, if possible, will hurry the output at its mines, while Russia will likely increase the imports from Sicily, reported last year at 15,068 tons. Considering, however, that the Anglo-Sicilian Co. carried 361,220 tons on December 31, 1903, which is equivalent to fully 9 months' exports, no apprehension need be felt of a short supply.

Sicilian Brimstone Market.—Messrs. Emil Fog & Sons write from Messina that December was exceedingly rainy, the plains of Catania are still inundated and the traffic interrupted, causing a shortage in brimstone arrivals. This is felt particularly at Catania, where the season for grinding sulphur for vines is beginning. Strikes among miners have again begun, owing to the increase in accident insurance rates. This insurance is compulsory by law. Proprietors or mine-farmers wish to deduct this premium from wages or make the Anglo-Sicilian Sulphur Company pay, and this has caused the disturbances. As a remedy an additional export duty of 1.50 lira per ton is proposed, which, if adopted by the government, will raise the value of brimstone 1s. all round. Present quotations per ton, f. o. b., are as follows: Best unmixed seconds, bulk, 82s. 3d.; ground, bags, 90s.; best thirds, bulk, 79s. 9d.; current thirds, 78s.; refined block, 89s.@91s. 9d.; refined roll, bags, 95s.; and casks, 100s. 6d.; in sticks, 104s. 3d.@106s. 9d.; sublimed flowers, pure, 108s. 6d.; current, 99s. 9d.; commercial, 94s. 6d. Freights are neglected. New York, 6s. 6d.; Boston, 7s. 6d.; Baltimore and Philadelphia, 7s.; Canadian ports, 8s. 6d.; Baltic, 9s. 6d.@10s.

Pyrites.—The approach of the fertilizer season has added vigor to this market, and in anticipation of an increased demand, importers are beginning to place their steamer charters. Prices for pyrites are firm.

We quote domestic pyrites $5 per ton for lump ore, f. o. b. Atlantic coast mines, and 10c. per unit for fines; sulphur content varies from 42@44%. Spanish pyrites, carrying from 46@52% sulphur, are quoted at 11@11.5c. per unit for lump, and 9.5@10c. for fines, delivered at Atlantic ports.

Nitrate of Soda.—Unprecedentedly large deliveries in the United States last month, coupled with the unexpectedly heavy increase in the European consumption and the higher ocean freight rates due to the Russo-Japanese war, have put the market in a very strong position. The opinion prevails that prices will go up, but the conservative element does not expect any irrational speculation at this end. Moment-

arily spot goods are worth $2.15@2.175 per 100 lb., while shipments are quoted $2.025@$2.075, and nearby arrivals, $2.10@$2.125.

The European statistical position for January is shown below, in long tons:

	1903.	1904.	Changes.
Exports to Europe	108,909	90,232	D. 18,677
Imports	133,670	160,610	I. 26,940
Deliveries	66,030	66,780	I. 750
Loadings for Europe, Feb. 1.	81,146	69,782	D. 11,364
Vis. supply, Feb. 1	664,410	670,460	I. 6,050

It is noteworthy that the visible supply (stocks and afloat) on February 1, 1904, is the largest reported in nearly three years, while deliveries show only a slight improvement as compared with previous years.

Official statistics for the nine months—April to December—of the third combination year, are as below, in Spanish quintals:

	1902.	1903.	Changes.
Production	23,791,854	25,307,919	I. 1,516,065
Exports	22,565,816	24,728,717	I. 2,162,901
World's consumption	18,449,556	19,376,116	I. 926,556
Vis. supply, Dec. 31	21,966,244	22,307,194	I. 340,950

It is noteworthy that the exports have increased at a considerably greater ratio than the production, while the marked improvement in consumption makes the increased visible supply on December 31—9,234,448 qtl. stocks, and 13,072,746 qtl. afloat—a factor of some interest.

Sulphate of Ammonia.—Evidently the demand from the South promises to grow, as good inquiries are reported which have resulted in business at $3.15@$3.175 per 100 lb. for gas liquor.

Phosphates.—Abroad sellers are uneasy on account of the continued low prices for superphosphates, which they fear may react on the phosphate market. Miners here with their limited stocks, are as yet little concerned about the foreign situation, probably because they are in possession of orders that will keep them shipping for some time to come. One factor, however, is rather disconcerting to exporters, and that is the firm ocean freight rates which may go higher as a result of the hostilities in the Far East.

Current ocean freight rates are about as follows:

	Shipping ports— Florida.	So. Carolina.	Algeria.
Baltic	$3.24@$3.36	$2.26	....
Continental	2.76@ 3.00	....	2.16
Mediterranean	3.36@ 3.60	....	....
United Kingdom	2.64@ 3.12	2.40@ 2.64	1.56@ 1.68

Prices for phosphates per ton are as follows:

Phosphates.	F. o. b.	C. i. f. Gt. Britain or Europe.
*Fla. hard rock, 77@80%	$6.50@7.00	$10.27@$11.06
land pebble, 68@73%	3.75@ 4.00	7.35@ 8.05
†Tenn, 78@82%	4.00@ 4.25	10.00@ 10.80
78%	3.75@ 4.00	.....
75%	3.25@ 3.50	.....
73@74%	2.95@ 3.20	.....
‡So. Car. land rock	3.25	.....
river rock, 55@60%.	2.75@ 3.00	5.75@ 6.88
Algerian 63@70%	.....	6.98@ 7.65
58@63%	.....	6.20@ 6.66
53@58%	.....	4.95@ 5.09
Tunis (Gafsa)	.....	6.05@ 6.65
Christmas Isle, 80@85%	.....	11.96@ 12.54
Ocean Isle, 82@88%	.....	12.33@ 13.18
Somme, Fr., 70@75%	.....	10.15@ 10.33
Bordeaux, Fr., 60@65%	.....	7.50@ 7.66
55@60%	.....	6.33@ 6.47
Liege, Bel., 60@65%	.....	6.78@ 7.11

* F. o. b. Florida or Georgia ports. † F. o. b. Mt. Pleasant. ‡On vessel, Ashley River, S. C.

Liverpool. Feb. 23.

(*Special Report of Joseph P. Brunner & Co.*)

There is no animation in trade at the moment, but quotations are about unchanged. Sulphate of copper is quiet this week at nominally the range named in our last letter.

Soda ash is not active. For tierces, nearest range for any position is about as follows: Leblanc ash, 48%, £5@£5 10s.; 58%, £5 10s.@£6 per ton, net cash. Ammonia ash, 48%, £4 5s.@£4 10s.; 58%, £4 10s.@£4 15s.. Bags, 5s. per ton under prices for tierces. Soda crystals are selling to a fair extent at generally £3 7s. 6d. per ton, less 5% for barrels, or 7s. less for bags, with special terms for a few favored markets. Caustic soda continues quiet, as follows: 60%, £8 15s.; 70%, £9 15s.; 74%, £10 5s.; 76%, £10 10s. per ton, net cash. Special quotations for the Continent and a few other export quarters.

Bleaching powder is slow of sale, and for hardwood £4 5s.@£4 10s. per ton, net cash, is nearest range, as to market.

Chlorate of potash continues dull at nominally 2⅜@2½d. per lb., net cash, for English make.

Bicarb. soda is without change, at £6 15s. per ton, less 2½% for the finest quality in 1 cwt. kegs, with usual allowances for larger packages, also special terms for a few favored markets.

Sulphate of ammonia is in limited demand and lower, at £13@£13 2s. 6d. per ton, less 2½% for good gray 24@25% in double bags f. o. b. here.

Nitrate of soda is well maintained on spot at £10 2s. 6d. per ton for ordinary up to £10 7s. 6d. per ton for refined, all in double bags f. o. b. here, less 2½%.

METAL MARKET.

New York, Feb. 17.

Gold and Silver Exports and Imports,

At all United States Ports in January and Year.

Metal	January.		Year.	
	1903.	1904.	1903.	1904.
Gold:				
Exports.	$85,951	$591,567	$85,951	$591,567
Imports.	2,010,851	8,225,508	2,010,851	8,225,508
Excess	I. $1,924,900	I. $7,633,941	I. $1,924,900	I. $7,633,941
Silver:				
Exports.	3,577,881	4,618,127	3,577,881	4,618,127
Imports.	1,494,556	2,609,372	1,494,556	2,609,372
Excess	E. $2,083,325	E. $2,008,755	E. $2,083,325	E. $2,008,755

These exports and imports cover the totals from all United States ports. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Exports and Imports, New York.

For the week ending February 13 and for years from January 1.

Period.	Gold.		Silver.	
	Exports.	Imports.	Exports.	Imports.
Week	$124,435	$32,913	$612,100	$57,099
1904	1,027,597	1,227,185	5,675,906	160,736
1903	37,303	646,532	2,053,632	118,304
1902	6,249,530	128,567	5,030,796	133,524

The figures for the current year include shipments too late for last week's summary.

The exports of merchandise from the United States in January showed a decrease of $33,156,083, as compared with December, but an increase of $7,671,214 over January, 1903. The statement of the Bureau of Statistics of the Department of Commerce and Labor is as follows:

	1903.	1904.
Exports	$133,992,269	$141,663,483
Imports	85,174,786	82,619,449
Excess, exports	$48,817,483	$59,044,034
Add excess of imports, silver		2,008,755
Total		$61,052,789
Deduct excess of export, gold		7,633,941
Balance of exports		$53,418,848

The movement of gold and silver in detail will be found at the head of this column.

The statement of the New York banks—including the 56 banks represented in the Clearing House—for the week ending February 13, gives the following totals, comparison being made with the corresponding week of 1903:

	1903.	1904.
Loans and discounts	$936,233,400	$999,569,900
Deposits	952,310,000	1,026,357,500
Circulation	43,736,900	40,737,100
Specie	181,803,400	205,647,500
Legal tenders	71,803,800	71,321,100
Total reserve	$253,607,200	$276,968,600
Legal requirements	238,077,525	256,589,375
Balance surplus	$15,529,675	$20,379,225

Changes for the week were an increase of $719,100 in loans and discounts, and decreases of $799,000 in deposits, $772,300 in circulation, $319,400 in specie, $1,343,900 in legal tenders, and $1,463,550 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison is made with the holdings at the corresponding date last year:

	1903. Gold.	1903. Silver.	1904. Gold.	1904. Silver.
N. Y. Ass'd—	$181,803,400	.....	$205,647,500	.....
England	175,618,685	.....	170,995,735	.....
France—	503,320,455	$218,874,705	468,733,040	$221,168,640
Germany—	172,795,000	60,710,000	169,350,000	59,500,000
Spain—	72,045,000	99,435,000	72,930,000	98,725,000
Netherlands—	23,488,500	32,809,500	26,181,000	32,774,500
Belgium—	16,383,335	8,191,665	16,280,000	8,140,000
Italy—	85,395,000	10,864,000	110,425,000	18,619,500
Russia—	389,950,000	37,225,000	430,250,000	36,565,000
Austria—	231,575,000	63,345,000	233,985,000	62,480,000

The returns of the Associated Banks of New York are of date of February 13, and the others February 11, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

Under the impulse of war influences, the Indian bazaars have been heavy buyers of silver, partly, perhaps, to replace sales made to the Indian Government. It is also reported that Russian-Chinese banks have been prominent buyers. To-day, however, the market is more quiet; sellers are in the majority and lower prices are probable.

The United States Assay Officer in New York reports receipts of 72,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to February 4 are reported by Messrs. Pixley & Abell's circular as follows:

	1903.	1904.	Changes.
India	£903,800	£1,692,989	I. £789,189
China	81,500	....	D. 81,500
Straits	50,782	38,103	D. 12,679
Total	£1,036,082	£1,731,092	I. £695,010

Receipts for the week were £230,000 in bar silver and £72,000 in Mexican dollars from New York, £3,000 in bar silver from Chile, £2,000 from the West Indies, and £13,000 from Australia; total, £320,000. Shipments were £255,300 in bar silver and £70,200 in Mexican dollars to Bombay; total, £325,500.

Indian exchange continues strong, and the Council bills offered in London were all taken on an average of 16.16d. per rupee. Moreover, further shipments of gold from Australia to India have been arranged for. Purchases of silver in London for Indian private account continue on a fair scale.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	$0.46	$0.48⅛
Peruvian soles and Chinese pesos	.42	.45
Victoria sovereigns	4.85⅛	4.87
Twenty francs	3.85	3.87
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

February.	Silver— New York, Cts.	Silver— London, Pence.	Copper— Lake, Cts. per lb.	Copper— Electrolytic, Cts. per lb.	Copper— London, £ per ton.	Tin, Cts. per lb.	Lead, Cts. per lb.	Spelter— N. Y., Cts. per lb.	Spelter— St. Louis, Cts. per lb.
11	58⅛	26⅞	12 @12⅛	11⅞ @12	56⅛	28¼	4.35 @4.40	4.90	4.70
12	....	26⅞	.....	.....	57	....	.....	.....	.....
13	58¼	26⅞	12⅛ @12¼	12 @12⅛	....	28¼	4.35 @4.40	4.90	4.70
15	59	27¼	12¼ @12⅜	12¼ @12¼	57¼	23½	4.35 @4.40	4.90	4.70
16	59½	27½	12¼ @12½	12⅜ @12¼	57⅛	28¼	4.35 @4.40	4.90	4.70
17	59½	27⅛	12⅜ @12½	12¼ @12¼	57⅛	23½	4.35 @4.40	4.92½ @4.95	4.72½ @4.75

London quotations are per long ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wire-bars: the price of electrolytic cathodes is usually 0.25c. lower than these figures

QUOTATIONS ON STERLING EXCHANGE.

February 11.....	4.85⅝	February 15.....	4.85⅝
" 12.....	4.85⅝	" 16.....	4.85⅛
" 13.....	4.85⅛	" 17.....	4.85⅝

Copper.—During the week under review the market has developed considerable strength. Consumers over here have bought freely for early as well as future delivery, and some business has also been done for export. The closing quotations are given as 12⅜@12½ for Lake; 12⅛@12¼ for electrolytic copper in ingots, cakes and wirebars, 11⅞@12c. in cathodes; 11⅞@12⅛ for casting copper.

It is reported that a strike has broken out at the mines of the Baltic, Champion and Trimountain Copper companies at the Lakes.

The market for standard copper in London, which closed last week at £57, opened on Monday at £57 5s., and the closing quotations on Wednesday are cabled as £57@£57 2s. 6d. for spot, £56 5s.@£56 7s. 6d. for three months.

Statistics for the first half of February show a decrease in the visible supplies of 300 tons.

Refined and manufactured sorts we quote: English tough, £61@£61 10s.; best selected, £62 @£62 10s.; strong sheets, £71@£71 10s.; India sheets, £68@68 10s.; yellow metal, 6¼@6⅜d.

Exports of copper from New York and Philadelphia for the week ending February 16 were 986 tons, somewhat less than last week. Imports were 560 tons from Mexico, showing an improvement.

Tin has been quiet but steady, without any special feature, consumers proceeding very cautiously and only covering their immediate requirements. The closing quotations are given as 28½ for spot and 28c. futures.

The foreign market, which closed last week at £127 15s., opened on Monday at £128, declined on Tuesday to £127, and the closing quotations on Wednesday are cabled as £125 12s. 6d.@ £128 15s. for spot, £125 15s.@£125 17s. 6d. for three months.

Lead has ruled very firm throughout the week, spot metal being rather scarce. The ruling quotations are 4.35@4.40 New York, 4.30@ 4.32½ St. Louis.

The foreign markets remain steady, Spanish lead being quoted at £11 12s. 6d.@£11 13s. 9d., English lead at £11 15s.@£11 16s. 3d.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of January 30, that the price of silver is 14 reales per oz. Exchange is 34.47 pesetas to £1. Pig lead is quoted 65.50 reales per quintal, which, on current exchange, is equal to £10 12s. 9d. per long ton, f. o. b. Cartagena. Shipments for the week were 100,000 kg. desilverized lead to Marseilles and 835,000 kg. to London.

Spelter.—The cold weather prevailing interferes somewhat with mining operations in the Joplin district. There has again been a good demand and the market closes higher at 4.72½ @4.75 St. Louis, 4.92½@4.95 New York.

It is reported that the plant of the Cherokee-Lanyon Spelter Co. has been partially destroyed by fire.

The foreign market remains strong, good ordinaries being quoted at £21 15s., special at £22.

Silesian Spelter Market.—Herr Paul Speier, writing from Breslau under date of January 30, states that the spelter market continues firm, with a tendency toward a higher level. Some uneasiness has been manifest, owing to the possibility of importations from the United States, but the recent advance in the New York market has removed, for a time at least, any danger from this source. The Silesian smelters have no large quantities of spelter on hand. Present prices are 21.5 marks for 50 kg. f. o. b. Breslau, which is equivalent to 4.64c. per lb. The association of sheet-zinc manufacturers has advanced the price of this product 1 mark per 100 kg.; the quotations for sheet-zinc are based, as heretofore, upon delivery at Oberhausen. Zinc dust is in good demand at from 41.5 to 42 marks per 100 kg., in lots of 10 tons or more.

Spanish Zinc Ore Market.—Business is quiet, with no exports for the week. Quotations for blende, 35% zinc, are 65 fr., f. o. b. Cartagena; for calamine, 30% zinc, 45 fr. per ton.

Antimony.—The market has developed considerable strength, and there is a fair demand on the part of consumers. The closing quotations are 7¾@8c. for Cookson's; 6¾@7c. for Hallett's; 6¼@6¾c. for U. S., Japanese, Italian, French, Hungarian and Chinese.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Quicksilver.—The New York price is $45.50 per flask for large lots, while a slightly higher figure is quoted for smaller orders. The San Francisco quotations continue at $44@$45 per flask for domestic orders and about $41.50 for export. The London price is £8 5s. per flask, with the same quotation asked by second hands.

Platinum.—Demand continues steady, and the price is firm at $18.50 per oz.

Messrs. Eimer & Amend, of New York, quote prices for platinum in manufactured forms, as follows: Heavy sheet and rod, 72c. per gram; foil and wire, 75c. per gram; platinum crucibles and dishes, 77c. per gram; perforated wire, like cones, Gooch crucibles, etc., 82c. per gram.

Cadmium.—According to Herr Paul Speier metallic cadmium was in good demand throughout 1903. Metal containing 99.5% cadmium sold at from 675 to 700 marks per 100 kg., delivered in Berlin.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

Aluminum	Per lb		Per lb
No. 1. 99% ingots	33@37c.	Ferro-Tungsten (37%)	38c.
No. 2. 90% ingots	31@34c.	Magnesium, pure (N. Y.)	60c.
Rolled Sheets	4c. up	Manganese	$2.75
Alum-bronze	20@23c.	Mangan'e Cop. (20% Mn)	32c.
Nickel-alum	33@39c.	Mangan'e Cop. (30% Mn)	38c.
Bismuth	$2.10	Molybdenum (Best)	$2.00
Chromium, pure (N. Y.)	80c.	Phosphorus, foreign	45c.
Copper, red oxide	50c.	Phosphorus, American	70c.
Ferro-Molybde'm (50%)	$1.25	Sodium metal	50c.
Ferro-Titanium (10%)	90c.	Tungsten (Best)	88c.
Ferro-Titanium (20@25% N. Y.	55c.		

Variations in price depend chiefly on size of order.

Missouri Ore Market. Feb. 13.

(From Our Special Correspondent.)

Several bins of choice zinc ore have been advanced to a basis of $35 per ton of 60% zinc, without, however, advancing the highest price of $38 per ton. There were advances in price here and there all over the district in an erratic and uneven manner. Buyers seem desirous of obtaining as much ore as possible without raising the price, but are not loath to push it up a little here and there in order to secure the grades they particularly need. Lead has gone off another dollar per ton, a total of $5 in four weeks, closing the week at $55.50 per ton. A year ago zinc sold at $37 top and lead at $51 per ton.

Following are the shipments of zinc and lead concentrates from the various camps of the Missouri-Kansas district for the week:

	Zinc. lb.	Lead lb.	Value.
Joplin	2,749,360	386,210	$60,205
Webb City—Carterville	2,664,310	339,920	50,645
Duenweg	1,156,870	95,560	22,315
Galena-Empire	787,350	165,040	18,180
Aurora	933,830	7,480	15,830
Carthage	837,300	.....	15,070
Alba-Neck	446,470	43,670	9,245
Badger	473,220	4,460	8,345
Granby	490,000	26,000	7,070
Mitchell	242,410	11,600	4,930
Oronogo	252,220	17,800	4,695
Carl Junction	184,700	.....	3,415
Spurgeon	108,180	88,230	3,455
Zincite	88,370	8,000	1,810
Diamond	102,420	.....	1,635
Prosperity	77,210	.....	1,310
McDowell	67,550	1,340	1,185
Cave Springs	63,170	2,800	1,155
Central City	23,760	9,590	610
Totals	11,748,700	1,207,700	$231,105
Seven weeks	66,616,920	8,556,930	$1,317,140

Zinc value, the week, $198,210; seven weeks, $1,083,465.
Lead value, the week, $32,895; seven weeks, $233,675.

Another heavy shipment of zinc is the most noted feature of the week; the two weeks of heavy shipments following in succession made an inroad upon the reserve stock. About 210 cars were loaded from the district this week, and nearly every buyer was complaining that he did not have enough cars. In one camp alone 300 tons were purchased that could not be shipped for lack of cars. As it is, the shipment is an exceptionally heavy one.

Average Prices of Metals per lb., New York.

Mo.	Tin.		Lead.		Spelter.	
	1903	1904.	1903.	1904.	1903,	1904.
Jan...	28.33	28.845	4.075	4.347	4.865	4.863
Feb ..	29.43	....	4.075	.....	5.043	....
Mar..	30.15	.....	4.442	.....	5.349	....
April.	29.81	.....	4.567	.....	5.550	....
May .	29.51	.....	4.325	.....	5.639	....
June .	28.34	.....	4.210	.....	5.697	....
July..	27.68	.....	4.075	.....	5.662	....
Aug..	28.29	.....	4.075	.....	5.725	....
Sept..	26.77	....	4.243	.....	5.686	....
Oct...	25.92	.....	4.375	.....	5.510	....
Nov..	25.42	.....	4.218	.....	5.538	....
Dec...	27.41	.....	4.162	.....	4.731	....
Year	28.09	.....	4.237	.....	5.400	....

NOTE.—The average price of spelter in St. Louis for the month of January, 1904, was 4.673c. per lb.

Average Prices of Copper.

Mo.	New York.				London.	
	Electrolytic.		Lake.		Standard.	
	1903.	1904.	1903.	1904.	1903.	1904.
Jan...	12.159	12.410	12.361	12.553	53.52	57.55
Feb...	12.778	.....	12.901	.....	57.34	.....
Mar..	14.416	.....	14.572	.....	63.85	.....
April.	14.454	.....	14.642	.....	61.72	.....
May..	14.435	.....	14.618	.....	61.73	.....
June .	13.942	.....	14.212	.....	57.30	.....
July..	13.094	.....	13.341	.....	58.64	.....
Aug..	12.962	.....	13.159	.....	58.44	.....
Sept..	13.205	.....	13.345	.....	56.82	.....
Oct...	12.801	.....	12.954	.....	55 60	.....
Nov..	12.617	.....	12.813	.....	56.30	.....
Dec..	11.952	.....	12,084	.....	56.36	.....
Year	13.235	.....	13.417	.....	57.97	.....

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Mo.	1902.		1903.		1904.	
	London. Pence.	N. Y., Cents.	London Pence.	N. Y., Cents.	London, Pence.	N. Y., Cents.
Jan..	25.62	55.56	21.98	45.57	26.423	57.055
Feb..	25.41	55.09	22.11	47.89	.....	.....
Mar..	25.00	54.23	22.49	48.72	.....	.....
April.	24.34	52.72	23.38	50.56	.....	.....
May..	23.71	51.31	24.89	54.11	.....	.....
June .	24.17	52.36	24.29	52.86	.....	.....
July..	24.38	52.88	24.86	53.92	.....	.....
Aug..	24.23	52.52	25.63	55.36	.....	.....
Sept..	23.88	51.52	26.75	58.00	.....	.....
Oct...	23.40	50.57	27.89	60.36	.....	.....
Nov..	22.70	49.07	27.01	58.11	.....	.....
Dec...	22.21	48.03	25.73	55.375	.....	.....
Year	24.09	52.16	24.75	53.45	.....	.....

The New York prices are per fine ounce; the London quotation is per standard ounce. .925 fine.

DIVIDENDS.

Company.	Payable.	Latest Dividend. Rate.	Total.	Total to date.
American Coal	Mar. 1	1.25	$62,500	$1,495,000
†Calumet & Ariz	Mar. 19	1.50	300,000	700,000
•Calumet & Hecla	Mar. 22	10.00	1,000,000	84,350,000
•Central Lead, Mo.	Mar 15	.50	5,000	395,000
•Dos Estrellas, Mex	Feb. 15	4.35	13,050	609,075
•Homestake, S. D.	Feb. 25	.25	54,600	12,476,950
•Lightner, Cal.	Feb. 20	.05	5,113	58,895
•Pac. Coast Borax	Feb. 29	1.00	19,000	1,573,500
†Standard Oil	Mar. 15	16.00	15,520,000	222,235,000

• Monthly. † Quarterly. ‡ Semi-annually.

ASSESSMENTS.

Company.	Delinquent.	Sale.	Amount.
Black Bess, Utah	Feb. 23	Mar 17	.02
Caledonia, Nev.	Mar. 2	Mar. 21	.15
Challenge Con., Nev.	Feb. 24	Mar. 16	.10
Godiva, Utah	Feb. 29	.....	1.00
La Palma, Mex.	Mar. 16	.....	.06
Marina Marsicano, Cal.	Feb. 29	Mar. 21	.05
Mexican, Nev.	Mar. 14	.....	.15
Milford, Utah	Mar. 4	Mar. 25	.00½
Occidental, Nev.	Mar. 10	Mar. 31	.05
Red Slide, Cal.	Mar. 5	.....	.05
Rodesino, Cal.	Mar. 3	.....	.03
Savage, Nev.	Mar. 11	.....	.10
Seg. Belcher & Mides, Nev.	Mar 10	.....	.05
Silver Shield, Utah	Mar. 3	Mar. 19	.03
Zubiate, S. D.	Mar. 12	.....	.20

STOCK QUOTATIONS

NEW YORK.

Company.	Par val.	Feb. 10 H.	Feb. 10 L.	Feb. 11 H.	Feb. 11 L.	*Feb. 12 H.	*Feb. 12 L.	Feb. 13 H.	Feb. 13 L.	Feb. 15 H.	Feb. 15 L.	Feb. 16 H.	Feb. 16 L.	Sales.
Acacia														
Amalgamated, c.	100	47⅝	45⅝	47	45⅞			47½	47½	48	47⅜	49¼	48¼	159,050
Anaconda, c.	25	66	64							69½				750
Anaconda, g.	7			16	15½									1,000
Andes, s.	1	30												100
Belcher, s.	3	33						36						800
Best & Belcher, s.	25	1.95		1.90										1,100
Brunswick, g.	5													
Bullion, s.	1									08				500
Caledonia, s.	1									1.05				100
Challenge, s.														
Chollar, s., g.	2½													
Confidence	3											1.05		100
Con. Cal. & Va., g. s.	2½	1.55		1.50				1.65		2.05	1.85			850
Con. Imperial, s.	1	04												1,00
Creede & C. Ck., g.	1													
Cripple Creek, g.	1			08½								08		1,50
Crown Point	2½							26						200
Daly, g. s	20													
Elkton, g.	1							65		64	63			600
El Paso, g.	1									65				500
Gold Dollar, g.														
Gould & Curry	1	42	41											300
Greene Con., c.	10	11	10⅝	10¾	10⅜			10⅝	10½	10⅛	15½	10¼	10	9,445
Hale & Norcross	3			63				70				79		4 80
Homestake, g.	100													
Horn Silver	20			1.25										50
Isabella, g.	1							21	20					1,500
Jack Pot, g.	1													
Julia, s.	1									05				200
Justice, s.	2	08								09				1,500
Leadville, s. l.	10							03						1,00
Little Chief, g. s.	50													
Mexican, s.	3	1.40		1.35				2.00		2.40				80
Mollie Gibson, g.	5									07		07		1,500
Occidental, s.	3													
Ontario, s. l.	100													
Ophir, s.	3			4.00						5.50				400
Overman, s.	2											30		300
Pharmacist, g.	1			01½										1,000
Phœnix, g.	1	10						10						1,500
Portland, g.	1			2.00								1.85		400
Potosi, s.	1	22	20							15				800
Quicksilver, Pf.	100											4.50		100
Savage, s.	3									62	58			300
Sierra Nevada, s.	3											76	75	300
Silver Hill, g. s.	1									74				300
StandardCon., g. s.	10	2.55	2.50	2.60										250
Tenn., c.	25													
Union Con., g. s.	1	75								1.00	98			600
Union Copper	25	¾		1⅞						¾	1⅛	¾		1,500
United, com., c.	100													
Utah, s.	1	23												200
White Knob, c.	10							7		7		7¾	7½	520
Work	1			08										1,00
Yellow Jacket, s.	3											46		300

c—Copper. g—Gold. l—Lead. s—Silver. Total sales, 194,615 shares. † Ex-dividend.
*Holiday.

BOSTON, MASS.

Company.	Par val	Feb. 10 H.	Feb. 10 L.	Feb. 11 H.	Feb. 11 L.	*Feb. 12 H.	*Feb. 12 L.	Feb. 13 H.	Feb. 13 L.	Feb. 15 H.	Feb. 15 L.	Feb. 16 H.	Feb. 16 L.	Sales
AdventureCon., c	$25	2½	2⅛	2⅜	2¼			2½	2⅛	2¼	2	2¼		600
Aetna c.	5													
Allouez, c.	25	4¼		4				4⅜		4¼	4	4		630
Amalgamated, c.	100	48⅛	45¾	46⅞	46			47⅜	47	49	47⅜	49½	43¾	25,467
Am. Gold Dredg.	5													
Am. Z., L. & Sm.	25													
Anaconda, c. s.	25									17⅝				50
Arcadian, c.	25											44	30	150
Arnold, c.	25													
Atlantic, c.	25			7½	7			7⅜		7½				220
Bingham Con.	50	21½	20	20¼	19¾			20		20		20		1 395
Bonanza Dev. g.	10	45												500
British Col., c.	5													
Calumet & Hecla	25	445	438	440				440		440		446		32
Centennial, c.	25	18	15¼	18	17½					17½	17½	18	17¾	1,775
Central Oil	25	7								7				200
Con. Mercur, g.	5	55		60	55			55		60	56	75		1,146
Copper Range	100	41¾	40½	41	40½			41⅛	40⅜	41	40⅝	41¾	40⅜	2,670
Daly West, g. s. l	20	34½	34	34⅛	33¾			34½	34¼	34⅛	34¼	34⅝	34¼	892
†Dominion Coal.	100	59	58½	58⅛				60	59	60	59½	60	59¾	620
Preferred	100													
Dominion I. & S.	100			8½				8¾		8¼		9		280
Elm River, c.	12									2				50
Franklin, c.	25	9	8	8½						8⅜	8	9	8¾	517
Granby Con.	10									3½		3¼		1,100
Guanajuato Con.	5	80								(2½				205
Isle Royal Con.	25			7¼						7				30
Mass Con., c.	25							4		5				55
Mayflower, c.	25													
Michigan, c.	25	5¾								5¼				175
Mohawk, c.	25	35½	35¼	35¼				35		35		35½	35¼	285
Mont. Coal & C.	25			3										200
Mont'l & Boston.	5	62½												100
New Idria, q.	5													
Nova Scotia St.	100													
Preferred	100													
Old Colony, c.	25									1		1		657
Old Dominion, c.	25			9				9¾						20
Osceola, c.	25	57	55½	56	55					57	56	57		345
Parrot, s. c.	10	23¾	23	23½	23⅛			23⅛		24		24¾	24¼	1,246
Phœnix Con, c.	25									2¼				50
Quincy, c.	25	90								90		88		36
Rhode Island, c.	25							1		1				80
Santa Fe, g. c.	10													
Shannon, c.	10	7⅞	7¾					8		8		8	7¾	1,320
Tamarack, c.	25	102								101		102		92
Tecumseh, c.	25													
Tennessee, c.	25													
Trinity, c.	25	4⅛	4⅛	4⅛	4¼			4¼		5	4⅛	4⅛	4¼	855
United c.	100													
United States, g.	10	20½	20	20¾	20			20¾	20½	20¾	20½	21	20½	3,955
U. S. Coal & Oil.	25	8⅝	8¾	9										350
Utah Con., g. c.	5	32⅜	31⅝	32⅝	32¼			32¾	32¼	33	32⅛	33⅛	32¾	6,631
Victoria, c.	25	3¼		3¾	3¼			3¾	3½	3½				570
Winona, c.	25	5⅞	5½	5¾	5¾			5¼		5⅝	5⅝	5⅞	5¾	885
Wolverine, c.	25	70						70				72	71	42
Wyandot, c.	25													

*Holiday. †Ex-dividend. ‡Assessment Paid. Total sales, 56,598 shares.
c—Copper g—Gold. l—Lead. q—Quicksilver. s—Silver.

Duluth, Minn. Jan. 30.

Company	Par Val.	Bid.	Asked.	Company	Par Val.	Bid.	Asked.
Calumet & Arizona	$10	$110	$111	Lake Sup. & Pitts.	$10	$130	$135
Calumet & Bisbee	10	7.50	8.00	Pitts. & Duluth	10	50.00	51.00
Calumet & Cochise	10	7.50	8.00	Shakespeare			.20
Calumet & Pittsburg	10	33.50	35.00	United Mexican			.50
Higgins Dev.	10	3.00		Wolv. & Arizona	10	4.60	
Junction Dev.	10	14.00	14.50	Yaqui	10		1.50

COAL, IRON AND INDUSTRIAL STOCKS.

Company.	Par val.	Feb. 10 H.	Feb. 10 L.	Feb. 11 H.	Feb. 11 L.	†Feb. 12 H.	†Feb. 12 L.	Feb. 13 H.	Feb. 13 L.	Feb. 15 H.	Feb. 15 L.	Feb. 16 H.	Feb. 16 L.	Sales
Allis-Chalmers	$100	11	10	12	11					15	12½	14¾	14¼	14	13⅛	4,410
Preferred	100	69½		60						64⅞	64⅜	64¼		64¾		1,530
Am. Agr. Chem	100															
Preferred	100															
Am. Sm. & Ref.	100	48¼	48									48½	48¼	49	48½	1,100
Preferred	100	91	90½	90½								90⅜		91¼		588
Col. Fuel & I.	100	32¼	31½	32						32		33¼	32½	32½		1,900
Preferred	10				31									65		100
Col. & H. C. & I.	100	14¾	14							14		14		14¼		910
*Crucible Steel	100	3⅞	3¾	3⅞												110
*Preferred	100	27	26½									27¾				40
General Chem.	100	52														100
Preferred	100															
*Mong. R. Coal	50															
*Preferred	100	25										25				30
National Lead	100	15								15½	15¼	15¼				600
Preferred	100															
*Phila. Nat. Gas	100											40				20
*Preferred	100															
*Pittsburg Coal	100									13¼	13⅛	14½	13½			1,252
*Preferred	100	49	47	48¾	48¼					49	48½	49½	48⅜			1,010
Republic I. & S.	100	7¾	7⅜							8½		8				800
Preferred	100	45	44¼											44½		430
Sloss-Shef S. & I.	100	37														100
Preferred	100															
Standard Oil	100			645	640							645		648		32
Tenn. C.I. & R.R.	100	37⅜	36½	38½						37¼	37	37⅜	37	37½	37	4,550
U.S. Red. & Ref.	100															
Preferred	100															
U.S. Steel Corp.	100	11¼	11	11⅜	11⅛					11⅝	11⅜	11⅝	11⅜	11½	11⅜	21,060
Preferred	100	58	56⅜	57¼	56⅜					57¾	57¼	58	57¼	57⅜	57½	140,621
Va.-Car Chem.	100	30	29	29	28¾					29		29¼	29	29½		2,400
Preferred	100															

*Pittsburg exchanges. †Holiday. Total sales, 183,723.

COLORADO SPRINGS, COLO.

Company.	Par Val	Feb. 6 H.	Feb. 6 L.	Feb. 8 H.	Feb. 8 L.	Feb. 9 H.	Feb. 9 L.	Feb. 10 H.	Feb. 10 L.	Feb. 11 H.	Feb. 11 L.	*Feb. 12 H.	*Feb. 12 L.	Sales
Acacia	$1	.08		.08	.07	.08	.06¾	.07½	.07	.07¼	.07			4,000
American Con.	1													
Anaconda	5	.16	.12½	.15½	.12½	.13½	.12	.17		.16½				500
Colo. City & M.	1	.03¼	.03	.03½	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛	.03¼	.03⅛			
C. K. & N.	1	.18⅛	.17½	.18¼	.17	.18	.17½	.18		.18⅛	.17			4,500
Crippie Ck. Con.	1	.07½	.07¼	.07¾	.07½	.08	.07¾	.08	.07¾	.08¼	.08¼			34,000
Des Moines	1	.02¼	.01¾	.02¼	.01⅝	.02⅛	.01⅝	.02⅛	.02	.02⅛				
Doctor Jack Pot	1	.10	.08½	.10	.08½	.10	.09½	.03⅝						8,300
Elkton Con.	1	.63¼	.59	.60	.59½	.60	.59⅛	.60	.59⅛	.60½	.60			6,512
El Paso	1	.62	.61¾	.62½	.62	.62½	.62	.64	.63	.65	.63½			21,000
Gold Dollar Con.	1	.05½	.05¼	.05½	.05¾	.05¼	.05⅛	.05¼	.05⅛	.05½	.05			11,000
Gold Sovereign.	1	.04⅛	.03⅞	.04⅜	.04⅛	.04⅛	.04	.04¼	.04	.04¼	.04⅛			15,000
Golden Cycle	1	.57	.55	.55	.54	.55½	.54	.55	.54	.54½	.54			6,500
Golden Fleece	1	.04		.04		.04		.04		.04				
Hart	1	.03¼	.02½	.03¼		.03¼	.02½	.04	.02½	.03	.02⅛			
Isabella	1	.17⅜	.15	.18	.15¼	.18½	.17½	.16½		.18½	.18			13,000
Jack Pot	1	.08		.07½		.03		.07½		.09	.07½			1,000
Keystone	1	.04½	.4⅛	.04⅜	.04⅛	.04¼	.04½	.04⅜	.04	.04⅜	.04			4,000
Last Dollar	1	.50		.45		.45		.45		.45				
Lexington	1	.04⅜	.03⅝	.05	.04⅜	.04⅜	.04⅛	.04¾	.04½	.04¾	.04⅛			
Little Puck	1	.03	.02¾	.03¼	.03	.03½	.03¼	.03⅜	.03½	.03⅝	.03⅛			61,000
Mollie Gibson	1	.04¾		.05½		.05		.05		.05				
Moon-Anchor	5	.12	.10	.12	.10½	.10¼		.10½	.09¾	.10¼	.09½			1,200
New Haven	5	.03½	.03¼	.03⅝	.03½	.03¼	.03	.03½	.03	.03	.02⅞			6,000
Old Gold	1	.09¼	.08½	.09¼	.08⅛	.08¾	.08⅛	.09	.08½	.09¼	.08⅜			4,300
Pharmacist	1	.04½	.04⅛	.04⅜	.04⅛	.04⅛	.04¼	.04⅛	.04	.04⅜	.04			2,000
Pinnacle	1	.04½		.04⅞	.03	.04	.03	.04	.03	.04	.03			
Portland	1	2.00	1.75	1.95	1.75	1.95	1.85	2.00	1.95	2.00	1.90			3,000
Vindicator Con.	1	.85	.60¼	.61¾		.75	.62	.63		.80	.63			
Work	1	.07¾	.07⅜	.07¾	.07½	.07½	.07⅜	.07¾	.07¼	.07	.03½			25,000
	1													

*Holiday. Total sales, 231,812 shares.

COLORADO SPRINGS (By Telegraph).

Company.	Feb. 15. H.	Feb. 15. L.	Feb. 16. H.	Feb. 16. L.
Anaconda	.16½	.12½	.16½	.12½
Cripple Ck Con.	.08⅜	.08¼	.08½	.08
C. K. & N.	.20	.17½	.18⅜	.17
Doctor-Jack Pot.	.10	.09	.10	.09
Elkton Con	.63½	.59⅞	.60½	.60
El Paso	.66	.65¾	.67	.66
Gold Dollar Con.	.05½	.05¼	.05¼	.05
Gold Sovereign	.04⅜	.04¼	.04⅜	.04¼
Isabella	.10¾	.10½	.18¼	.18

Company.	Feb. 15. H.	Feb. 15. L.	Feb. 16 H.	Feb. 16 L.
Jack Pot	.08½	.07½	.09	.07½
Last Dollar	.45	.40	.45	.40
Mollie Gibson	.06	.05	.06	.05
Moon Anchor	.10	.09	.12	.09½
Old Gold	.09½	.09¼	.10	.09⅜
Pharmacist	.04¼	.04⅛	4¼	.04⅛
Portland	2.00	1.75	2.03	1.70
Vindicator	.70	.62	.65½	.64½
Work	.06¾	.06½	.07	.06⅜

SAN FRANCISCO.

Company.	Location.	Feb. 4 H.	Feb. 4 L.	Feb. 5 H.	Feb. 5 L.	Feb. 6 H.	Feb. 6 L.	Feb. 8 H.	Feb. 8 L.	Feb. 9 H.	Feb. 9 L.	Feb. 10 H.	Feb. 10 L.	Sales
Central Eureka	Cal													
Golden Anchor	Nev.													
Golconda	Ore.													
Hannapah	Nev.													
Lightner Mg. Co.	Nev.	3.25												500
MacNamara	Nev.		.13		.15	.14	.16		.24	.20	.23	.20			8,500
Mont. Tonopah	Nev.	1.45	1.40	1.42½	1.40	1.40		1.45	1.35	1.42½	1.37½	1.40	1.37½	5,973
South Eureka	Cal													
Ton. Belmont	Nev.				.66	.65	.65		.62	.59	.66	.65	.64	.59	5,100
Ton. Midway	Cal		.42	.41	.43	.42	.43		.44	.43	.45	.43	.45	.43	8,700
Ton. Mg. Co.	Nev.			6.00			6.12½	6.00	6.00		6.00				900
Ton. North Star	Nev.		.35	.34							.35				700
Ton. & Salt Lake	Nev.														
Ton. Superior	Nev.		.25	.20											200

San Francisco and Tonopah Mining Exchange.
Total sales, 30,573 shares.

SAN FRANCISCO (By Telegraph).

Company.	February 15.	February 16.
Belcher	.33	30
Best & Belcher	2.25	2.00
Caledonia	.96	.97
Challenge Con	.23	.22
Chollar	.21	.21
Confidence	1.05	1.55
Con. California & Virginia	1.90	1.75
Crown Point	.21	.21

Name of Company.	February 15.	February 16.
Gould & Curry	.50	.43
Hale & Norcross	.82	.97
Mexican	2.45	2.35
Ophir	5.50	5.25
Overman	.27	.28
Sierra Nevada	.72	.60
Union Con.	1.05	.95
Yellow Jacket	.46	.45

STOCK QUOTATIONS

MEXICO.* Feb. 4

Company.	Shares Issued.	Prices. Bid.	Ask.
Durango:			
Ca. Min. de Penoles	2,500	$3,800	$4,100
San Andres de la Sierra	200	10,000	.....
Guanajuato:			
Angustias, Pozos	2,400	45	50
Cinco Senores y An., aviadoras	2,000	65	70
Cinco Senores y An., aviada	400	65	70
Providencia, SanJuan de la Luz	6,000	60	67
Queensland y Australia	300	72	85
Guerrero:			
Delfina, 1st serie	2,500	52	55
Delfina, 2nd serie	2,500	37	45
Garduno y Anexas	7,200	35	45
Hidalgo:			
Amistad y Condordia	9,000	80	81
Carmen, aviada	1,100	80	100
Guadalupe Fresnillo Mill	1,000	170	200
Guadalupe Fresnillo Mine	1,400	70	80
La Blanca, aviadora	1,536	.....	.....
La Blanca, aviada	768	.....	.....
La Reina y An., aviadora	5,000	14	16
Luz de Maravillas, aviadas	1,100	.....	20
Maravillas y An., aviador	1,680	120	140
Maravillas el Lobo	1,000	130	180
Palma y An., aviador	1,800	14	20
Real del Monte	2,554	.....	.....
Refugio, aviada	12,800	5	7
Santa Anay An., aviadora	1,800	85	100
Santa Anay An., aviada	600	30	40
Sta. Gertrudis y An., aviadas	9,600	13	15
Sta. Gertrudis y An., aviadora	28,800	81	82
Santo Tomas Apostol aviadoras	5,100	2	3
San Felipe de Jesus, aviadora	3,600	15	17
San Felipe de Jesus, aviada	1,200	6	10
San Rafael y An., Trompillo	1,200	1,670	1,700
San Rafael y An., aviada	1,200	680	700
Soledad, aviada	960	680	700
Sorpresa, aviada	960	290	300
.....	.....	.....	.....

Name of Company.	Shares Issued.	Prices. Bid.	Ask.
Mexico:			
Alacran	2,400	25	30
Aldebarren	2,000	40	50
Buen Despacho	3,000	30	32
Dos Estrellas	3,000	1,700	1,803
La Esperanza (El Oro.)	3,000	1,500	1,500
La Reformia, aviadores	2,000	23	28
Providencia, pagadoras	1,600	.....	.....
Providencia, liberadas	800	.....	.....
Santa Ana, Esperanza	2,400	90	.....
Michoacan:			
Luz de Borda, aviadora	3,000	50	60
Luz de Borda, aviado	1,000	25	30
Santiago y An., Tlal.	4,000	3	8
Nuevo Leon;			
La Fraternal	1,000	580	620
Norias de Bajan	1,000	880	920
San Luis Potosi:			
Concepcion y An	3,000	80	85
El Barreno, aviadora	2,000	48	55
Sta. Maria de la Paz	2,400	160	165
San Diegoy Annexas	2,400	8	10
Zacatecas:			
Asturiana y An	2,500	50	58
Candelaria y Pinos	2,500	130	140
Cubiertas	2,400	.....	.....
Esperanza y An	2,400	6	8
Lourdes	2,500	22	30
Luz de Minillas, pagadoras	2,000	15	30
Nueva Quebradilla, aviadoras	2,400	95	105
Nueva Quebradilla, aviadas	600	70	80
San Carlos y Annexas	2,500	80	90
Sta. Maria de Gaud	2,500	64	70
Miscellaneous:			
Bartolome de Medina	2,000	78	80
Guadalupe Hacienda	20,000	.....	.....
La Luz Hac. (Pachuca.)	3,750	.....	.....
La Reina (Chihuahua.)	192	.....	.....
Naica (Chihuahua.)	100	11,000	13,000
Natividad (Oaxaca) aviadora	1,800	1,050	1,100
Natividad (Oaxaca) aviadas	600	.....	.....
San Francisco Hac	6,000	62	69
Santa Ana Huantla Morelos	4,000	.....	.....
Union Hacienda	3,000	215	230

*Values are in Mexican currency.

TORONTO, ONT. Feb. 13

Company.	Par val	Prices. High.	Low.	Sales
Black Tail, g.	$1	.04	.02	.....
Cariboo-McKin	1	.07	.03	.....
Cariboo Hydr.	1	.75	.70	.....
Center Star, g. s.	1	.23½	.22	2,000
Crows Nest, C.C.	100	2.60	2.00	.....
Dominion Coal	100	.61	.58	25
Dominion S. & I.	100	.09	.08	.....
Fairview, g. s.	1	.04	.02	.....
Giant, g. s.	1	.03½	.01½	.....
Deer Trail, g. s.	1	.02	.01	.....
Iron Mask, g. s.	1	.06	.....	.....
Morrison, g. s.	1	.04	.02	.....
.....	.....	.....	.....	.....

Company.	Par val	Prices. High.	Low.	Sales
Granby Smelter	$10	4.25	3.75	.....
Mountain Lion, g.	1	.18	12	.....
North Star, g. s.	1	.09	.06	.....
Nova Scotia Steel.	100	.....	.....	.....
Payne, s. l.	1	.16	.10	.....
Rambler Carib	1	.35	.25	.....
Republic, g.	1	.03	.02	.....
St. Eugene, g. s.	1	.44	.30	.....
Virtue, g. s.	1	.07	.06	.....
War Eagle Con.	1	.14	.09	.....
Sullivan, g. s.	1	.06	.03	.....
Winnipeg, g. s.	1	.04	.....	.....
Wonderful, g. s.	1	.63	.02	.....

g—Gold. l—Lead. s—Silver. Total sales, 2,025.

SALT LAKE CITY.* Feb. 6

Company	Par Val	High	Low	Sales.
Ajax	10	.07	.06½	1,700
Butler Liberal	....	.10½	.10½	1,000
Carisa	1	.10⅝	.10	700
Century	1	.83	.82	1,000
Con. Mercur	1	.58¼	.55	4,700
Daly	5	2.17½	2.17½	100
Daly-Judge	1	4.10	3.60	850
Daly West	20	35.00	34.00	238
Dalton	....	.00½	.00½	1,000
Ezl. & Blue Bell	....	.50	.50	400
Ingot	½	.01¾	.01¼	11,000
Joe Bowers	....	.00⅝	.00¾	37,000
La Reine	....	.04	.03½	700
L. Mammoth	1	.41½	.39	7,040

Name of Company	Par Val	High	Low	Sales.
May Day	¼	.07¼	.06¾	14,400
M. Washington	½	.01⅝	.01½	68,500
Naildriver	....	.55	.55	200
N. Y. Bonanza	....	.20	.18½	18,800
Petro	....	.06	.04½	2,600
Sacramento	5	.20½	.19½	16,000
Star Con	1	.20½	.19	6,850
Tetro	1	.30	.32	4,000
Utah	....	.45	.45	700
Uncle Sam Con.	1	.25	.25	1,700
Victor Con	....	.05	.05	2,500
Wabash	1	.05½	.05¼	5,000
Yankee Con	1	.45	.42½	500

*By our Special Correspondent. All mines are in Utah. Total sales, 209,178 sha

PHILADELPHIA, PA.

Company.	Par val.	Feb. 10 H.	L.	Feb. 11 H.	L.	*Feb. 12 H.	L.	Feb. 13 H.	L.	Feb. 15 H.	L.	Feb. 16 H.	L.	Sales
Am. Cement	$10	.....	.....	7¼	.....	.....	.....	.....	.....	7¼	.....	.....	.....	125
Cambria Iron	50	.....	.....	46½	.....	.....	.....	.....	.....	.....	.....	.....	.....	6
Cambria Steel	50	19¾	19¼	19⅝	16	.....	.....	19¾	19½	19¾	19⅛	.....	.....	728
Pa. Steel, pfd	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Susq. I. & S.	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
United Gas I.	50	86	85¼	85	84½	.....	.....	.....	.....	85¼	84⅞	.....	.....	554
Lehigh Nav'n	50	65¾	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6
Philadelphia	50	40¼	39½	39¾	39½	.....	.....	40	39½	39⅝	39¾	.....	.....	544
U.S. Steel	100	11¾	11	.....	.....	.....	.....	11½	.....	11⅝	11¾	.....	.....	2,270
U.S. Steel. pf.	100	58	56½	57½	57¾	.....	.....	57⅞	57¼	57⅞	57½	.....	.....	0,290

*Holiday. †Ex-Dividend Total sales 14,461.

LONDON. Feb. 5

Company.	Shares Issued.	Par value. £.	s.	d.	Latest dividend. Amt. s.	d.	Date.	Quotations. Buyers. £	s.	d.	Sellers. £	s.	d.
American:													
Alaska-Treadwell	200,000	5	0	0	1	6	Jan., 1904	4	5	0	4	7	6
Anaconda	1,200,000	5	0	0	2	0	Nov., 1903	3	10	0	3	15	0
Camp Bird	820,000	1	0	0		9	Feb., 1904	1	5	0	1	7	6
Copiapo	112,500	2	0	0	6	10	May, 1903	1	2	6	1	7	6
De Lamar	80,000	1	0	0	2	0	Oct., 1903		10	0		12	6
El Oro	1,080,000	1	0	0		9	Jan., 1904	1	2	6	1	5	0
Frontino & Bolivia	128,682	1	0	0	3	0	July, 1901		7	6		10	0
Le Roi	200,000	5	0	0	5	0	Nov., 1899		15	0		10	0
Le Roi No. 2	120,000	5	0	0	1	0	Feb. 1904		15	0	1	0	0
Montana	657,128	1	0	0		6	April, 1899		1	6		2	0
Standard	500,000		4	0		2½	Sept., 1903		3	0		4	0
Stratton Independence	1,000,007	1	0	0		6	Dec., 1903		4	9		5	3
St. John del Rey	546,265	1	0	0		6	Dec., 1903		15	0		16	0
Tomboy	300,000	1	0	0	1	0	June, 1902	1	10	0	1	15	0
*Utah	300,000	1	0	0	6	3	Jan., 1904	6	7	6	6	12	6
Ymir	200,000	1	0	0	1	0	Mar., 1902		2	6		7	6
European:													
Linares	15,000	3	0	0	1	0	Mar., 1903	2	0	0	2	10	0
Mason & Barry	185,172	1	0	0	11	0	May, 1903	3	12	6	3	17	6
Rio Tinto	325,000	5	0	0	32	6	Nov., 1903	49	0	0	49	5	0
Rio Tinto, preferred	325,000	5	0	0	2	6	Nov., 1903	6	0	0	6	5	0
Tharsis	625,000	2	0	0	6	0	May, 1903	4	7	6	4	12	6
West Australian:													
*Associated	495,388	1	0	0	2	0	Jan., 1904	2	18	9	3	1	3
Cosmopolitan	400,000	1	0	0	1	0	May, 1903		16	6		17	0
Golden Horseshoe	300,000	5	0	0	6	0	Nov., 1903	8	15	0	8	17	6
Great Boulder	1,750,000		2	0		9	Dec., 1903	1	7	6	1	8	0
Great Fingall	250,000	1	0	0	6	0	Jan., 1904	8	6	3	8	8	9
*Ivanhoe	200,000	5	0	0	5	0	Jan., 1904	8	16	3	8	18	9
Kalgurli	120,000	1	0	0	2	6	Jan., 1904	5	16	3	5	18	9
Lake View	250,000	1	0	0	rts.		Aug., 1902	1	5	0	1	7	6
Oroya-Brownhill	450,000	1	0	0	2	6	Dec., 1903	3	13	9	3	16	3
Miscellaneous:													
*Brilliant Central	100,000	1	0	0	1	0	Feb., 1904	2	17	6	3	2	6
Briseis	600,000	1	0	0					6	3		6	9
Broken Hill	960,000		8	0	1	6	Feb., 1904	1	9	0	1	10	0
Mt. Lyell	275,000	3	0	0	4	3	Sept., 1903		16	6		17	6
Mt. Morgan	1,000,000	1	0	0		3	Feb., 1904	2	2	6	2	7	6
Waihi	497,412	1	0	0	2	6	Dec., 1903	4	18	9	5	1	3
Indian:													
Champion Reef	513,832		10	0	6	6	Jan., 1904	7	6	3	7	8	9
Mysore	566,043		10	0	4	4	Jan., 1904	6	8	9	6	11	3
Nundydroog	484,000		10	0	1	6	Nov., 1903	2	3	9	2	6	3
Ooregum	343,000		10	0		9	Dec., 1903	1	1	3	1	3	9
Ooregum, pfd	240,000		10	0	1	9	Dec., 1903	1	7	6	1	10	0
South African:													
Angelo	600,000	1	0	0	4	0	Jan., 1904	6	2	6	6	7	6
Bonanza	200,000	1	0	0	10	0	Feb., 1904	2	6	3	2	8	9
British South Africa	4,436,019	1	0	0	nis.		May, 1889	2	0	0	2	1	3
Cape Copper	300,000	2	0	0	4	0	Jan., 1904	2	15	0	2	17	6
Cape Copper, pfd	75,000	2	0	0	1	9	Jan., 1904	2	12	6	2	17	6
City & Suburban	340,000	4	0	0	8	0	Feb., 1904	6	7	6	6	12	6
Consol. Gold-Fields	2,000,000	1	0	0	...		.....	6	1	3	6	2	6
Crown Reef	120,000	1	0	0	20	0	Oct., 1903	16	0	0	16	10	0
De Beers, preferred	800,000	2	10	0	10	0	Jan., 1904	19	5	0	19	7	6
De Beers, deferred	1,000,000	2	10	0	15	0	Jan., 1904	19	16	3	19	18	9
East Rand	980,000	1	0	0	5	0	Aug., 1903	6	8	9	6	10	0
Ferreira	90,000	1	0	0	22	6	Feb., 1904	19	15	0	20	5	0
Geldenhuis	200,000	1	0	0	6	0	Feb., 1904	5	12	6	5	17	6
Geduld	400,000	1	0	0	rts.		Mar., 1902	6	0	0	6	3	6
Henry Nourse	125,000	1	0	0	10	0	Feb., 1904	8	10	0	8	15	0
Jubilee	50,000	1	0	0	5	0	Feb., 1904	4	5	0	4	10	0
Jumpers	100,000	1	0	0	5	0	Aug., 1899	2	15	0	3	0	0
Langlaagte	470,000	1	0	0	2	0	Feb., 1904	3	5	0	3	7	6
May	288,750	1	0	0	3	6	Feb., 1904	4	0	0	4	2	6
Meyer & Charlton	100,000	1	0	0	5	0	Jan., 1904	5	10	0	5	15	0
Modderfontein	290,000	1	0	0	rts.		Apr., 1902	8	2	6	8	5	0
Namaqua	94,331	2	0	0	3	0	Dec., 1903	2	17	6	3	2	6
New Jagersfontein	200,000	5	0	0	10	0	Dec., 1903	28	0	0	28	1	0
New Primrose	325,000	1	0	0	3	0	Jan., 1904	3	13	9	3	16	3
Rand	1,795,958		5	0	4	0	Aug., 1902	9	5	0	9	7	6
Robinson	750,000	5	0	0	5	6	Feb., 1904	9	7	6	9	12	6
*Robinson Deep	950,000	1	0	0	3	0	Jan., 1904	4	18	9	5	1	3
Rose Deep	425,000	1	0	0	2	6	Feb., 1904	7	7	6	7	12	6
Salisbury	100,000	1	0	0	2	0	Mar, 1899	1	12	6	1	17	6
Sheba	1,075,000	1	0	0		6	July, 1899		10	0		12	6
Village	400,000	1	0	0	3	6	Feb., 1904	5	0	0	5	5	0
Wemmer	80,000	1	0	0	10	0	Jan., 1904	10	0	0	10	10	0

*Ex-dividend.

LONDON (By Cable.)*

Company.	Feb. 10 £.	s.	d.	Feb. 17 £.	s.	d.	Company.	Feb. 10 £.	s.	d.	Feb. 17 £.	s.	d.
Anaconda	3	0	0	3	7	6	El Oro	1	2	6	1	2	6
British So. Africa	1	18	9	2	2	6	Modderfontein	8	1	10½	7	10	0
Camp Bird	1	4	0	1	5	3	Rand Mines	8	16	3	9	8	9
Con. Gold Fields	5	13	9	6	3	9	Rio Tinto	47	5	0	48	10	0
De Beers	19	10	0	19	16	3	Simmer & Jack	1	8	3	1	8	1½
East Rand	6	0	0	6	9	4½	Tomboy	1	7	6	1	8	9

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. Jan 28

Company.	Location.	Capital Stock. Francs.	Par value. Fr.	Latest divs. Fr.	Prices. Opening. Fr.	Closing. Fr.
Anzin, Coal	France			290.00	5,505.00	5,525.00
Boleo, c	Lower Cal.	12,000,000	500	62.50	1,794.00	1,780.00
Champ d'Or, g	S. Africa	3,375,000	25	3.75	19.00	19.00
Courrieres, Coal	France	600,000	300	110.00	2,755.00	2,705.00
Fraser River, g	Brit. Col.	250,000	25	.....	5.50	5.50
Huanchaca, s	Bolivia	40,000,000	125	5.00	74.25	72.00
Laurium, z. l	Greece	16,300,000	500	25.00	338.00	328.00
Malfidano, z	Italy	12,500,000	500	50.00	592.00	580.00
Metaux, Cie. Fran. de	France	25,000,000	500	22.50	484.00	480.00
Mokta-el-Hadid, i. l	Algeria	18,312,000	500	40.00	839.00	845.00
Nickel, n	N. Caledonia	15,000,000	250	22.50	512.00	505.00
Penarroya, Coal	Spain		500	45.00	1,144.00	1,130.00
Vielle Montagne z	Belgium	9,000,000	30	30.00	685.00	690.00
Wyoming, o	California		25	.....	331.00	332.00

c—Copper. g—Gold. i—Iron. l—Lead. n—Nickel. o—Oil. s—Silver. z—Zinc.

ST. LOUIS, MO.* Feb. 13

Name.	Par Val.	Prices. Bid.	Ask.	Name.	Par Val.	Prices. Bid.	Ask.
Am.-Nettie, Colo	$10	$0.25	$0.40	Columbia Lead, Mo.	$10	$3.00	$4.50
Catherine Lead, Mo.	10	.90	1.50	Con. Coal, Ill.	100	17.00	18.00
Central Coal & C.	100	58.00	59.00	Doe Run Lead Mo.	100	110.00	115.00
Central C. & C., pf.	100	70.00	71.00	Granite Bimet. Mt.	10	.42	.45
Central Lead, Mo.	100	110.00	115.00	St. Joe Lead, Mo.	10	15.50	17.00

*By our Special Correspondent.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

(See also Market Reviews.)

ABRASIVES—		
Carborundum, f.o.b. Niagara Falls, Powd.,	lb.	$0.08
Grains	"	.10
Corundum, N. C	"	.07@.10
Chester, Mass	"	.04½@.05
Barry's Bay, Ont	"	.07½@.09½
Mont. f.o.b. Chicago	"	.07@.07½
Crushed Steel, f.o.b. Pittsburg	"	.05½
Emery, in kegs: Turkish flour	"	.03½
Grains	"	.05@.05½
Naxos flour	"	.03½
Grains	"	.05@.05½
Chester flour	"	.03½
Grains	"	.05@.05½
Peekskill, f.o.b. Easton, Pa., flour	"	.01½
Grains, in kegs	"	.02½
Crude, ex-ship N. Y.: Abbott (Turkey)	lg. ton	26.50@30.00
Kuluk (Turkey)	"	22.00@24.00
Naxos (Greek) h.gr.	"	26.00
Garnet, per quality	sh. ton	25.00@35.00
Pumice Stone, Am. Powd	lb.	.01@.02
Italian, powdered	"	.01¼
Lump, per quality	"	.04@.05
Rottenstone, ground	"	.02½@.04½
Lump, per quality	"	.06@.20
Rouge, per quality	"	.10@.30
Steel Emery, f.o.b. Pittsburg	"	.07
ACIDS—		
Boracic, crystals	"	.10¾@.11
Powdered	"	.11¼@.11½
Carbonic, liquid gas	"	.12½
Chromic, crude	"	.20
Hydrofluoric, 30%	"	.03
48%	"	.05
60%	"	.11
Sulphurous, liquid anhy. f.o.b. Bound Brook, N. J.	"	.06
ALCOHOL—Grain	gal	2.46@2.48
Refined wood, 95@97%	"	.50@.55
Purified	"	1.25@1.30
ALUM—Lump	100 lbs.	1.75
Ground	"	1.85
Porous	"	1.00
Powdered	"	3.00
Chrome, com'l	"	2.75@3.00
ALUMINUM—		
Nitrate	lb.	1.50
Oxide, com'l, common	"	.06½
Best	"	.20
Pure	"	.80
Hydrated	100 lbs.	2.60
Sulphate, com'l	"	1.25@1.50
AMMONIA—		
Aqua, 16°	lb.	.03
18°	"	.03¼
20°	"	.03¾
26°	"	.05½
AMMONIUM—		
Carbonate, lump	"	.07½
Powdered	"	.08¼
Muriate gram	"	.05½
Lump	"	.09½
Nitrate, white pure (99%)	"	.12
Phosphate, com'l	"	.09
Pure	"	.12
ANTIMONY—Glass	"	.30@.40
Needle, lump	"	.05½@.06
Powdered, ordinary	"	.05¾@.07¾
Oxide, com'l white, 95%	"	.09½
Com'l white, 95%	"	.12
Com'l gray	"	.07
Sulphuret, com'l	"	.16
ARSENIC—White	"	.03@.03½
Red	"	.06½@.06¾
ASPHALTUM—		
Barbadoes	"	.02½@.03
Ventura, Cal	sh. ton	32.00
Cuban	lb.	.01½@.03½
Egyptian, crude	"	.05½@.06
Trinidad, refined	sh. ton	35.00
San Valentino (Italian)	lg. ton	16.00
Seyssel (French), mastic	sh. ton	21 00
Gilsonite, Utah, ordin'y	lb.	.03
Select	"	.03¾

BARIUM—		
Carb. Lump, 80@90%	sh. ton	$25.00@27.00
92@98%	"	26.00@29.00
Powdered, 80@90%	lb.	.01¾@.02
Chloride, com'l	100 lbs.	1.67½@1.76
Chem. pure cryst	lb.	.05
Nitrate, powdered	"	.05⅞
BARIUM—		
Sulphate (Blanc Fixe)	lb.	$0.02
BARYTES—		
Am. Crude, No. 1	sh. ton	9.75
Crude, No. 2	"	8.00
Crude, No. 3	"	7.00
Floated	"	18.50
Foreign gray	"	13.50
Snow white	"	17.25
Floated	"	18.75
BAUXITE—Ga. or Ala. Mines:		
First grade	lg. ton	5.50
Second grade	"	4.75
BISMUTH—Subnitrate	lb.	2.00
Subcarbonate	"	2.25
BITUMEN—"B"	"	.03½
"A"	"	.05
BONE ASH	"	.02½@.02¾
BORAX	"	.07¼@.07½
BROMIDE—Bulk	"	.48
CADMIUM—Metallic	"	1.40
Sulphate	100 lbs.	2.00@2.50
CALCIUM—Acetate, gray	"	1.40
" brown	"	.90
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh. ton	70.00
Carbonate, ppt	lb.	.05
Chloride	100 lbs.	.70@.90
CEMENT—		
Portland, Am., 400 lbs.	bbl.	1.50@1.75
Foreign	"	1.75@2.25
"Rosendale," 300 lbs	"	.80
Slag cement	"	1.25@1.50
CERESINE—		
Orange and Yellow	lb.	.13
White	"	.14
CHALK—Lump, bulk	sh. ton	3.00
Ppt. per quality	lb.	.04@.05¼
CHLORINE—Liquid	"	.30
Water	"	.10
CHROME ORE—		
(50% ch.) ex-ship N. Y.	lg. ton	24.75
Bricks f.o.b. Pittsburg	M	175.00
CLAY, CHINE—Am. com., exdock, N. Y.	lg. ton	8.25
Am. best, ex-dock, N. Y	"	9.25
English, common	"	10.75
Best grade	"	16.75
Fire Clay, ordinary	sh. ton	4.25
Best	"	6.00
Slip Clay	"	5.00
COAL TAR PITCH	gal.	.08
COBALT—Carbonate	lb.	1.75
Nitrate	"	1.50
Oxide—Black	"	2.50
Smalt, blue ordinary	"	.06
Best	"	.20
COPPERAS—Bulk	100 lbs.	.47½
In bbls	"	.52½
COPPER—Carbonate	lb.	.18@.19
Chloride	"	.25
Nitrate, crystals	"	.35
Oxide, com'l	"	.19
CRYOLITE	"	.06½
EXPLOSIVES—		
Blasting powder, A	25-lb. keg	.65
Blasting powder, B	"	1.40
"Rackarock," A	lb.	.25
"Rackarock," B	"	.18
Judson R.R. powder	"	.10
Dynamite (20% nitro-glycerine)	"	.13
(30% nitro-glycerine)	"	.14
(40% nitro-glycerine)	"	.15
(50% nitro-glycerine)	"	.16½
(60% nitro-glycerine)	"	.18
(75% nitro-glycerine)	"	21
Glycerine for nitro	"	.12½@.12¾
FELDSPAR—Ground	sh. ton	@10.00
FLINT PEBBLES—Danish. Best	lg. ton	14.75
French, Best	"	11.75
FLUORSPAR—		
Lump	sh ton	8.00@10.00
Ground	"	11.50@13.50

FULLER'S EARTH—Lump	100 lbs.	$.80
Powdered	"	.85
GRAPHITE—Am. f.o.b. Providence, R.I., lump	sh. ton	8.00
Pulverized	"	30.00
Am. pulv., other than R. I., f. o. b., New York	"	45.00
Best flake	"	150.00
German, com. pulv	lb.	.01¼@.01½
Best pulverized	"	.01½@.02
Ceylon, common pulv	"	.02¾@.03½
Best pulverized	"	.04@.08
Italian, pulverized	"	.01¼
GYPSUM—Ground	sh. ton	8.00@8.50
Fertilizer	"	7.00
Rock	lg. ton	4.00
English and French	"	14.00@16.00
INFUSORIAL EARTH—Ground.		
American best	"	20.00
French	"	37.50
German	"	40.00
IODINE—Crude	100lbs	2.45
IRON—Muriate	lb.	.05
Nitrate, com'l.	"	.01¼
True	"	.04
Oxide, pure copperas color	"	.05@.10
Purple-brown	"	.02
Venetian red	"	.01@.01½
Scale	"	.01@.03
KAOLIN—(See China Clay.)		
KRYOLITH—(See Cryolite.)		
LEAD—Acetate, white	lb.	.08½ @ .8¾
Brown	"	.06½@.06¾
Nitrate, com'l	"	.06½
" gran	"	.08¼
LIME—Com., abt. 250 lbs	bbl.	.80
Finishing	"	1.00
MAGNESITE—Greece.		
Crude (95%)	lg. ton	5.00@5.50
Calcined	sh. ton	15.50
Bricks, best imp., f.o.b. N.Y.	M.	155.00
Bricks, domes., per qual., f.o.b. Pittsburg	"	160.00@200.00
MAGNESIUM—		
Carbonate, light, fine pd	lb.	.05
Blocks	"	.07@.09
Chloride, com'l	"	.01¾
Fused	"	.20
Nitrate	"	.60
Sulphate	100 lbs.	.75@.95
MANGANESE—		
Crude powd. 70@75% binoxide	lb.	.01¼@ 01½
75@85% binoxide	"	.01½@.02¾
85@90% binoxide	"	.02¾@.03¼
90@95% binoxide	"	.03¼@.05½
Carbonate	"	.16@.20
Chloride	"	.04
Ore	unit	.12@.20
MARBLE—Flour	sh. ton	6.00@7.00
MERCURY—Bichloride	lb.	.77
MICA—N. Y. gr'nd, coarse	sh. ton	33.00@38.00
Fine	lb.	.00⅞@.02
Sheets are sold as to size and quality		
MINERAL WOOL—		
Slag, ordinary	sh. ton	19.00
Selected	"	25.00
Rock, ordinary	"	32.00
Selected	"	40.00
NICKEL—Oxide, No. 1	lb.	1.00
No. 2	"	.60
Sulphate	"	.20@.21
OILS—Black, reduced 29 gr.		
25@30, cold test	gal.	13@.13¾
15, cold test	"	.13¾@.14¼
Zero	"	.18¼@.19¾
Summer	"	.12¾@.13¼
Cylinder, dark steam ref	"	.14¼@.16¼
Dark, filtered	"	.18¼@.19¼
Light, filtered	"	.20¼@.21¼
Extra cold test	"	.24¾@.31¾
Gasoline, 86 @90°	"	.17@.22
Naphtha, crude, 68°@72°	bbl.	12.40
"Stove"	gal.	.15
Linseed, domestic raw	"	.40@.42
Boiled	"	.44
Calcutta, raw	"	.65
OZOKERITE	lb.	.11½
PAINTS AND COLORS—		
Chrome green, common	"	.03
Pure	"	.15
Yellow, common	"	10¼
Best	"	.14
Lampblack, com'l	"	.04½
Refined	"	.07
Litharge, Am. pow'd.	"	.05¼@.05¾
English Glassmakers'	"	.08½@.08⅞
Metallic, brown	sh. ton	19.00
Red	"	16 00
Ocher, Am. common	"	8.50@9.00
Best	"	21.25@25.00
Dutch, washed	lb.	.03
French, washed	"	.01¼@.01⅞
Orange mineral, Am	"	.07⅝@.07¾
Foreign, as to make	"	.08½@.10¼
Paris green, pure, bulk	"	.11

PAINTS AND COLORS—		
Red lead, American	lb	$0.06¼@$0.06½
Foreign	"	.07@.08¼
Turpentine, spirits	gal.	.67 @.67½
White lead, Am., dry	lb.	.04¾@.05
American, in oil	"	.05¾@.06½
Foreign, in oil	"	.09 @.09½
Zinc, white, Am., ex. dry	"	.04⅝@.04¾
Foreign, red seal, dry	"	.06@.06¼
Green seal, dry	"	.06¼@.09½
POTASH—		
Caustic, ordinary	"	.04½@.04⅝
Elect. (90%)	"	.06¼
POTASSIUM—		
Bicarbonate cryst	"	.08¼
Powdered or gran	"	.14
Bichromate, Am	"	.08½@.08¾
Scotch	"	.08½@.09
Bromide	"	@.30
Carbonate (80@85%)	"	.03½@.04½
Chlorate, powdered	"	.06¾@.07¼
Crystals	"	.06½@.07
Chromate	"	.35
Cyanide (98@99%)	"	.19½@.20
Kainit	lg. ton	9.30
Manure salt, 20%	100 lbs.	.66
D'le Manure Salt, 48@53%	"	1.12
Muriate, 80@85%	"	1.83
95%	"	1.86
Permanganate	lb.	.09½@.09¾
Prussiate, yellow	"	.14½@.14¾
Red	"	.36 @.36¾
Sulphate, 90%	100 lbs.	2.11
96%	"	2.14
Sylvanit	unit	.41
QUARTZ—(See Silica.)		
SALT—N. Y. com, fine 280 lbs.	bbl.	.72@1.18
N. Y. agricultural	sh. ton	4.40
SALTPETER—Crude	100 lbs.	3.45@3.60
Refined	"	4.00@4 50
SILICA—		
Ground quartz, ord'ry	sh. ton	9.00@10.00
Best	"	12.00@13.00
Lump quartz	"	2.50@4.00
Glass sand	"	2.75
SILVER—Chloride	oz.	.65
Nitrate Crystals	"	.36
Oxide	"	.85@1.10
SODIUM—		
Bicarb., ord., bulk f.o.b. works	100 lbs.	1.30
Extra domes., f.o.b. works	"	3.50
Bichromate	lb.	.06¾
Carbonated ash, high test, in bags, f.o.b. works	100 lbs.	.72½@.80
Foreign, f.o.b. N. Y.	"	.90@.92½
Caustic, 70@76%, f. o. b. works	"	1.75@1.90
Foreign, f.o.b N. Y.	"	1.80@1.95
Chlorate, com'l	"	.06¾@.07
Hyposulphite, Am	"	1.60@1.65
German	"	1.70@1.90
Nitrate, spot and nearby	"	2.15@2.17½
Shipments	"	2.02½@2.08
Peroxide	lb.	.45
Phosphate	"	.02½@.02¾
Prussiate	"	.10¼
Sal soda, f.o.b. works	100 lbs.	.60
Foreign, f.o.b. N. Y.	"	.67½
Silicate, concentrated	lb.	.05
Com'l	"	.01
Sulphate, com'l	100 lbs.	.82½
Sulphide, crystals, bbl.	lb.	.01¾
Sulphite crystals	"	.02½
SULPHUR—Roll	100 lbs.	1.85
Flour	"	1.90
Flowers, sublimed	"	2.20
TALC—N. C., 1st grade	sh. ton	20.00
N. Y., Fibrous, best	"	10.28
French, best	100 lbs.	2.00
Italian, best	"	2.25
TAR—Regular	bbl.	2.30
Oil, bbl	"	4.00
TIN—Crystals, bbl	lb.	.21½
Oxide	"	.35
URANIUM—Oxide	"	2.25@3.00
ZINC—Metallic, ch. pure	"	.07@.09¾
Carbonate, ppt	"	.09
Chloride solution, com'l	"	.02¼
Chloride granular	"	.04¾@.05½
Dust	"	.04¾@.04¾
Sulphate	"	.02 @.02¼

THE RARE EARTHS.

BORON—Nitrate	lb.	$1.50
CALCIUM—Tungstate (Scheelite)	"	.60
CERIUM—Nitrate	"	10.00
DIDYMIUM—Nitrate	"	35.00
ERBIUM—Nitrate	"	40.00
GLUCINUM—Nitrate	"	20.00
LANTHANUM—Nitrate	"	30.00
LITHIUM—Carbonate	"	1.35
LITHIUM—Nitrate	oz.	.60
STRONTIUM—Nitrate	lb.	.07⅞@.08¼
THORIUM—Nitrate 49@50%.	"	4.50
URANIUM—Nitrate	oz.	.25
ZIRCONIUM—Nitrate	lb.	8.00

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.